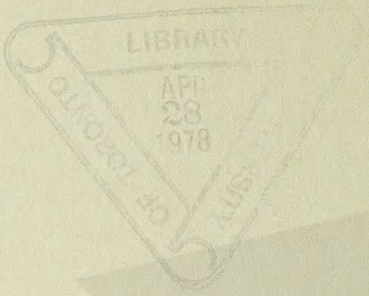


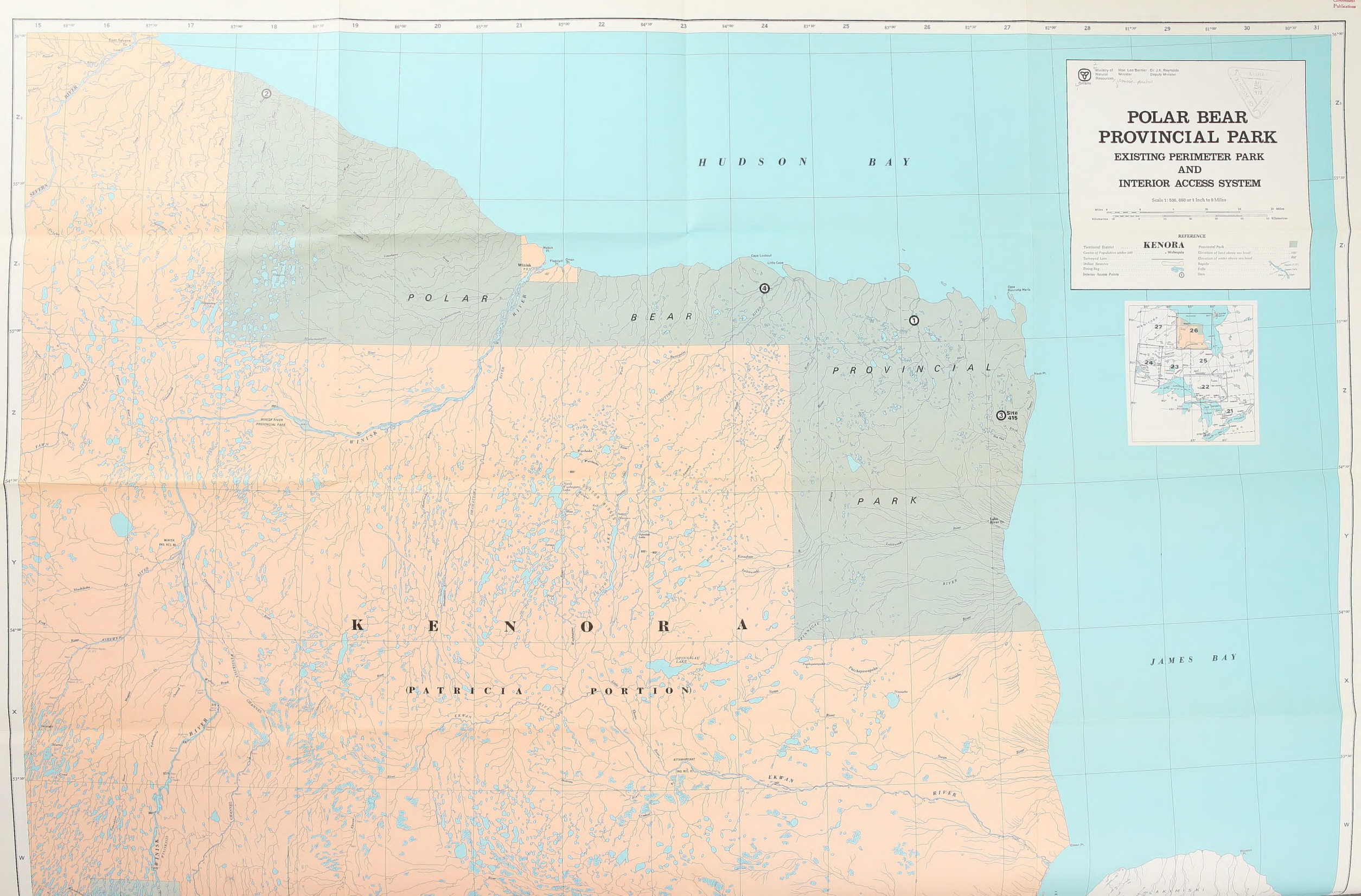


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Ministry of Natural Resources
Kenora District Office
Kenora, Ontario

Kenora
APR 1978

POLAR BEAR PROVINCIAL PARK

EXISTING PERIMETER PARK AND INTERIOR ACCESS SYSTEM

Scale 1:506,880 or 1 inch to 8 miles

Miles 0 5 10 15 20
Kilometres 0 5 10 15 20

REFERENCE

KENORA

Territorial District
Centre of Population under 500
Summer Low
Indian Reserve
Fishing Right
Interior Access Points

Provincial Park
Elevation of land above sea level
Elevation of water above sea level
Rapid
Falls
Dam





Through care has been exercised to ensure the map is accurate in relation to the original map, but no responsibility is assumed for any errors or omissions.

Source: General and Special Boundary Commission, Ontario, 1911.

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Preface

With the establishment of Polar Bear Provincial Park in 1970, the Ministry of Natural Resources initiated a planning program leading to the preparation of a master plan for the park. Following several years of study, *Background Information* is presented to familiarize the public with the park, its location, size, regional context, access, and the existing and potential visitor use. In addition, the natural and cultural resources of the park, in relation to the Hudson-James Bay Lowlands, are discussed. Public review and comment on the accompanying *Planning Proposal* are invited.

Planning Proposal outlines the preliminary objectives, policies and considerations regarding the future planning, preservation, development and management of the park. After the public has had an opportunity to respond to these publications, another document will be circulated to summarize the public input and outline the issues and alternative solutions. This will be followed by a policy statement on Polar Bear Provincial Park by the Minister of Natural Resources. Subsequently, a master plan for the park will be prepared.

The reader is invited to take this opportunity to contribute to the planning of Ontario's largest provincial park. Cree translations of both publications are available for the native people in the park area.



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Introduction





Regional Context

Polar Bear Provincial Park occupies a substantial part of the Ontario portion of the Hudson Bay Lowlands between Attawapiskat on James Bay and Fort Severn on Hudson Bay (Figure 1).

The community of Winisk is outside the park but close to its geographical centre. Winisk is 340 miles (547 km) from Moosonee and 800 miles (1,287 km) from Toronto. Winisk has a population of 135; Attawapiskat, 1,000; and Fort Severn, 150.

Park Site

Polar Bear Provincial Park is situated along the northwestern coast of James Bay and the southwestern coast of Hudson Bay according to Schedule 88, Ontario Regulation 183/1970:

"Beginning at the intersection of the southerly shore of Hudson Bay with longitude 87°; thence southerly along that longitude to latitude 55°; thence easterly along that latitude to longitude 83° 45'; thence southerly along that longitude to latitude 54°; thence easterly along that latitude to the westerly shore of James Bay; thence in a general northerly and westerly direction along the shore of James Bay and of Hudson Bay to longitude 84° 55'; thence southerly along that longitude to latitude 55° 13'; thence westerly along that latitude to longitude 85° 15'; thence northerly along that longitude to the southerly shore of Hudson Bay; thence in a general northwesterly direction along that shore to the place of beginning."

The park is under the administrative jurisdiction of the Ontario Ministry of Natural Resources. It lies within the Ministry's Northern Region and Moosonee District and thus becomes the responsibility of the District Manager at Moosonee.

Polar Bear Provincial Park was established by Order-in-Council on April 30, 1970, as a "primitive park"* under the Ontario Provincial Parks Classification and Zoning System, which designates the purpose of primitive parks:

"To set aside representative areas of natural landscapes for posterity and to provide an opportunity to enrich and expand the outdoor knowledge and recreation experience in natural, wild conditions and to provide an outdoor laboratory for non-destructive scientific study. Also recognized is the psychological need, of many people, to know that unspoiled wilderness areas exist. . . .

. . . This class of park . . . requires a large tract of land with a combination of natural features of high quality for low intensity recreational activities (e.g., wilderness travel), and, where feasible, for scientific study.

. . . The area will be set aside exclusively for the stated purpose and the natural resources reserved from exploitation. Mechanized equipment and vehicles will be allowed only as needed for area protection and for other emergency demands. Other modes of travel may be restricted in respect of specific areas.

. . . The area will be managed as a wilderness area with development, if present, confined to trails, portages and designated campsites."

The area was established as a primitive park because it admirably represents sub-arctic and low arctic landscapes in one of the least altered tracts of land remaining in Ontario. Its name attests to the presence of polar bears along the Hudson Bay and James Bay coastlines.

The following definition of a "wilderness" alludes to some of the possible significant values to society of wilderness parks such as Polar Bear:

"A wilderness in Ontario is: a substantial area of provincial land and/or water where the forces of nature are allowed to function freely; where the impact of man is largely unnoticeable; where the only means of travel is by historic, non-mechanized means (on foot or by hand-propelled vessel); where there are opportunities for a wilderness experience of solitude, space, time and an element of unity with nature. Furthermore, it is an area of such a size as to ensure ecological and perceptive viability; managed in such a way as to ensure the protection of all values indefinitely. It may have scientific/ecological, conservation/educational, recreational, historic, cultural, political, spiritual, aesthetic and economic values" (Clark and Moroz, 1973, p.8).

Many of the values are related. Examples of recreational and aesthetic values are fairly obvious. One of the more important ecological values of Polar Bear Provincial Park is to stand as an environmental benchmark against which to compare areas of development in the Hudson-James Bay Lowlands. A more general value of the park might be to serve as a temporary sanctuary for people and permit them to escape from the potentially deleterious effects of the rapid changes in our life styles.

A political value pertains to the insurance of "a freedom of choice for the future that is inherent in undeveloped landscapes; the choice of the ultimate in primeval, unpolluted environments, solitude and beauty" (Clark and Moroz, 1973, p.18).

*This designation is proposed to be changed to "wilderness park," which is the term employed in this document.

Regional Context

- 300 300 miles (482.8 km) from Winisk
- 600 600 miles (965.6 km) from Winisk
- 900 900 miles (1448.4 km) from Winisk

- Ministry of Natural Resources
- Northern Region Boundary
- Polar Bear Provincial Park



1 inch equals 300 miles
1 centimetre equals 193 kilometres

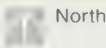


Figure 2

Aircraft Access

Access Zones

Aircraft Access

- 1 Brant River
- 2 Shagamu River
- 3 Site 415
- 4 Sutton River

- Airstrip
- Seaplane landing
- Possible seaplane landing



1 inch equals 32 miles
1 centimetre equals 20.3 kilometres

North



Because of the rather severe restrictions which the wilderness designation places on land-use, "it is essential that we recognize what economic values are involved (mineral, forest, fish and wildlife, recreation or power) and their magnitude so that . . . we will be aware of what we are foregoing as a matter of public policy in order to establish" an area like Polar Bear Provincial Park (Clark and Moroz, 1973, p.24). Even in so remote an area of Ontario as Polar Bear, where traditional land-use conflicts are absent, it will be difficult to honour completely the wilderness concept as expressed in the definition. Even the use of the area by native people means that the ideal will be altered to some extent.

With an area of approximately 9,300 square miles in size, (24,087 km²), Polar Bear is the largest park in Ontario and one of the largest parks of any description anywhere on earth. Algonquin Provincial Park has an area of 2,910 square miles (7,537 km²); Jasper National Park, 4,200 (10,878 km²); and Yellowstone National Park in the United States, 3,470 (8,987 km²). The area surrounding the park is Crown land.

Access

At present, the only practical method of reaching the park is by aircraft. Recreation aircraft are permitted to land only at certain locations within access zones. These are located at (1) Brant River, (2) Shagamu River, (3) Site 415, and (4) Sutton River as shown in Figure 2. Potential landing areas probably exist at other points such as Big Shagamu Lake, Kinushseo River, and Site 421 airstrip. Additional reconnaissance is required to determine other suitable landing spots. Aircraft landing near the periphery of the park is possible at Attawapiskat, Hawley Lake, Fort Severn, Shagamu Lake, Winisk and other locations. In addition to seaplane landing at all of these places, there are airstrips at Attawapiskat, Fort Severn, Site 415 and Winisk.

Air

Scheduled flights from Moosonee to Winisk are operated by a commercial airline which has regular Monday return trips. A one-way trip takes 4½ hours. The 1975 return fare was \$186 and the goods rate was 51¢ per pound. It is important to check timetables well in advance of proposed trips as rates and times are subject to change.

Charter service from Moosonee is also provided by commercial flying companies. The 1975 charter rates from Moosonee to Site 415 and return were as follows: by DC-3, \$1,575; by Dehavilland Otter, \$1,400; and by Dehavilland Beaver, \$975.

Newly developed landing strips at Attawapiskat, Big Trout Lake, Fort Albany, Fort Severn and Moosonee will supplement strips at Geraldton, Hearst, Kapuskasing, Nakina, Pickle Crow, Red Lake, Sioux Lookout, Thunder Bay, Timmins and Winisk which have been in operation for some time. Approved seaplane landing is available near all of these locations.

Land

The closest Ontario highway to the park, Number 808 (east of Pickle Lake), is 225 miles (362 km) from Polar Bear's southwestern boundary. Closer still, 200 miles (322 km) away from the southeastern boundary, is Moosonee, which is joined to Highways 11, 579 and 807 near Cochrane by the Ontario Northland Railway.

Water

Water travel to the park, along the Hudson Bay or James Bay coasts from Moosonee, is possible but impractical without the services of a competent guide because of the shallow water, the rocks, the tides, unpredictable weather and a poorly defined and inhospitable shoreline.

Other

Access to the periphery of the park is possible by all-terrain vehicle, hovercraft, and snow machines, none of which is practical at present because of the hazards of isolation and climate.



Exposed peat, in black spruce tundra



Market Analysis

Outdoor recreation opportunities in the Hudson-James Bay Lowlands in Ontario are associated largely with Crown land and three provincial parks. There is an abundance of Crown land in the Lowlands for wilderness recreation such as canoe tripping, but the traffic is quite low. In a number of locations, there are excellent goose hunting areas and brook trout fishing waters for which the region is well known.

There are three provincial parks within the Hudson-James Bay Lowlands – one wild river park, one natural environment park and one wilderness park. Winisk Wild River Park provides opportunities for wilderness canoeing on one of the more attractive rivers in this part of Ontario. Tidewater Provincial Park offers a natural environment, outdoor recreation experience in a strategically located position between Moose Factory and Moosonee. In Polar Bear Provincial Park, the first of Ontario's three wilderness parks, visitors have an opportunity to enjoy a wilderness experience in the most isolated part of the province. All three of the parks within the Lowlands are lightly used at present.

Existing Visitor Use

During its years of existence, Polar Bear Provincial Park has had very few visitors. Probably fewer than 50 people enter the park each year. They are believed to be recreationists and scientists. However, an important point in planning for a wilderness park is that it is unnecessary that the park be used extensively by the public.

Some use of the park is made by native trappers and hunters from the villages of Attawapiskat, Fort Severn, and Winisk. To date, the majority of Polar Bear's visitors have been interior campers who have entered the park by landing at three provisional access zones: Brant River, Site 415 and Sutton River. Most of the Brant River visitors are from the United States. Their primary interest in the park is the brook trout fishing on the Brant River.

The Site 415 visitors tend to be from Ontario universities. Their main interest is the scientific research of the arctic tundra area which surrounds Site 415. Most of the visitors to the Sutton River area are primarily interested in the goose hunting available at the Cree-operated camp near the river mouth.

Anticipated Visitor Use

Visitation at Polar Bear Provincial Park is very low due to the difficulties and expense of access, but it is likely to increase in the future. The interior use of parks such as Quetico and Algonquin is increasing every year. Visitation at Polar Bear will increase with the development of airstrips in the Hudson-James Bay Lowlands, provided the North American trends toward greater affluence and more leisure time continue. Visitation will also increase if and when long-range, commercial transportation (for example, by hovercraft-like vehicles) becomes a reality in the James Bay area. Conversely, any prolonged contraction of this continent's economy would have an adverse effect on Polar Bear visitation. The stricter rationing of aircraft fuel, for example, would tend to eliminate the longer flights. It is important to realize that, even with a large tract of land like Polar Bear Provincial Park, overuse is possible, particularly at access zones. This is especially true because of the delicate nature of the tundra and seashore estuary ecosystems. For these reasons, it is important that the recreational carrying capacity of Polar Bear be determined at the earliest possible time.



The Park Environment





Climate

Polar Bear Provincial Park falls within two climatic regions: the tundra area, and the sub-arctic area as shown in Figure 3. Temperature and precipitation are shown in Figure 4.

Autumn

The fall season, equinox to solstice, as it is known in more temperate latitudes, is short and stormy in the park. The proximity of Hudson Bay and James Bay acts at this time of year as an ever-so-slight moderating influence on the oncoming cold weather. Cold air pours down in a southeasterly flow from the top of Hudson Bay and northern Baffin Island in an anti-cyclonic upper air flow. The October mean temperature for Winisk is 34.8°F (1.6°C). However, at inland, southern points in the park, the October mean could be as much as 40°F (4.4°C).

Killing frosts are possible in virtually any month, but by mid-September they can be expected on a regular basis. Lakes are frozen by late October, and the rivers by late November. By late October, there is ice in the inlets along the coast, but the two bays do not become ice-covered until late December. September is the only ice-free month on the bays.

With the fall dominance of frequent sub-freezing air from the north, low pressure areas invade the park region at three to four-day intervals. The northwest winds, which prevail during fall, bring snow off Hudson Bay particularly during the invasion of lows. The first major snows come in September. The park is snow-covered during most of October. November and December are the months of highest snowfall in Polar Bear. The average November and December snowfalls for Winisk are 13.5 inches (34.3 cm) and 15 inches (38.1 cm) respectively. Over one-third of Winisk's total annual snowfall, 79.5 inches (201.9 cm), comes during these months.

This is also the time of maximum cloudiness and highest winds. During November, it is cloudy more than 80 percent of the time. Low cloud and strong winds of occasionally 50 miles (80.5 km) per hour and more are generally associated with low pressure areas in the autumn months.

Winter

By late November, persistently cold weather dominates the park, and freeze-up is almost complete. During winter, solstice to equinox, the park is under the influence of high pressure, frigid, dry, polar continental air which produces prevailing winds from the northwest. The mountain ranges of the far west and the Torngat Mountains of Labrador act as tremendously effective physical barriers in preserving the cold, dry identity of the polar air mass by preventing it from mixing with the warm, moist maritime air.



Cyclonic activity, which develops in southwestern Alberta and the adjacent United States and which sweeps across southern Canada to the Great Lakes and up the St. Lawrence, does occasionally bring warm, somewhat moist, continental air from the south. This is particularly true from December until the end of February when a temporary shift in upper air movement to the north of Hudson Bay allows for the periodic invasions of cyclonic systems.

Winter in Polar Bear Provincial Park is a time of intense and enduring cold. Along the coast, the two bays are ice-covered except for occasional, persistent shore leads. At this time, the surface of Hudson Bay and James Bay are climatically identical to that of the tundra, with the exception of some open-water channels and shore leads.

During December, solar radiation is at a minimum. Much of the park receives less than six hours of sunlight per day. The sole modifying force is the Hudson-James Bay area as there is a modest heat transfer through the ice from the water to the air. Over ice-free areas, heat transfer is considerably more pronounced and usually results in steam fog, otherwise known as "arctic sea smoke."

Because of the slightly modifying tendency of the bays, Polar Bear has less extreme temperatures than areas further inland at the same latitude. Temperatures of -40°F (-40°C) are common, but -50°F (-45.6°C) readings are not. The cold, however, is more persistent than in almost any other area at the same latitude. The January mean temperature for Winisk is -13.5°F (-25.3°C), only a fraction of a degree less than at Churchill, Manitoba, 350 miles (563.3 km) to the northwest. Temperatures at Lake River are probably a degree or so warmer, while near the western park boundary, readings, on the average, may be a little colder. Temperatures during the winter months are almost always below zero.

Snow falls in the park area throughout winter into May, and at times even into June. After November and December, the months from January to May are most important in terms of snowfalls. At Winisk, well over half the annual total of 79.5 inches (201.9 cm) falls at this time. North of the tree line, the fierce winter winds compact the powdery snow into hard drifts. The windward, coastward sides of beach ridges are sometimes free of snow because of the driving wind. South of the tree line, the snow is less compacted because of shelter provided by trees so that accumulations of 50 inches (127 cm) and more of loose snow are not uncommon.

Figure 3

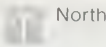
Climatic Regions and Permafrost Occurrence

- Continuous Permafrost
- Southern Limit of Continuous Permafrost
- Discontinuous Permafrost
- Widespread Permafrost
- Southern Fringe of Permafrost Region

Note: The line demarking the southern limit of continuous permafrost also divides the park into its tundra (north of the line) and sub-arctic (south of the line) climatic regions.



1 inch equals 32 miles
1 centimetre equals 20.3 kilometres





Winter, particularly late winter, is the season of least cloudiness in Polar Bear. Cloud cover averages less than 50 percent for this time of year. The tundra climatic region of Polar Bear Provincial Park is part of one of the windiest areas of Canada in winter. Average wind speeds along the coast are about 12 to 15 miles (19.3 to 24.1 km) per hour. Almost continual brisk winds and cold temperatures make the Hudson Bay area the coldest place in North America on the basis of wind chill.

The strongest winds are generally produced by low pressure areas. Typically, the gale-force winds combine with low temperatures and falling snow to produce in severe winter storms. Winisk, on the average, experiences at least one blizzard every month of the winter. These storms remain intense for a day to a day and a half. The ceaseless winter winds produce blowing snow which can often seriously restrict visibility. West of Polar Bear Provincial Park, 350 miles (563 km) away, along the Hudson Bay coast at Churchill, there is blowing snow an average of 73 days a year.

Spring

The importance of Hudson Bay and James Bay as climatic controls becomes most apparent during the spring and summer. Spring, equinox to solstice, in the park is delayed and the long winter continues into May. The delay is largely the result of the cooling effect of sea ice, unmitigated by the warming influence of cyclonic storms from the south. Spring, as it is known in more temperate parts of Ontario, is nonexistent. March, April and part of May are usually dominated by a high-pressure system of cool, polar continental air from the north. The April mean temperature for Winisk is a chilly 15.1°F (-9.4°C), while only 250 miles (402 km) to the southwest, at Lansdowne House on Attawapiskat Lake, the April mean is over 10°F (in this case, 6.6°C) higher, at 27.1°F (-2.8°C). It is a cool spring in spite of the great increase in daylight which reaches 17 hours in most of Polar Bear Provincial Park in June.

The spring melt begins at the end of April or early May. Most of the rivers break up between the second half of May and early June. The ice pack in the bays begins to move about the second half of June, and coastal travel in small craft is sometimes possible. The Hudson Bay coast of the park can be difficult to travel until August as north winds jam the ice close against the shore.

March to mid-May is a season of minor winds and light snowfalls. The winds tend to be from the northwest and north. From mid-May on, well into the summer months, cyclonic weather from the south occasionally invades the park region. With rising temperatures and melting snow and ice, fog and low cloud cover become more common. Cloud cover along the coast in late spring averages about 80 percent. This means that the warming effects of a considerable amount of solar radiation are impeded, thus delaying the progress of spring.

Summer

Even during summer, solstice to equinox, the warmest season, Polar Bear Provincial Park can be a cold, windswept place in its tundra climatic zone. For its latitude (55° at the James Bay coast), it is a very cool spot with a typically arctic climate. The major climatic control, considerably more important than the long hours of daylight, is the very cold, seldom ice-free water of Hudson Bay and northern James Bay which almost never warms to more than 45°F (7°C). For this reason, Cape Henrietta Maria and the coastal area to the west and south of this headland, in every way, show the influence of a polar climate.

July is the warmest month in the park. The July mean at Winisk is 53.1°F (11.7°C). This is within a degree of Churchill's July mean. Inland, near the southern boundary of the park, away from the chilling influence of the bays, the July mean is probably a few degrees warmer. But near the coast at Winisk, near 90°F (32.2°C) temperatures are not unknown. Pack ice at times remains in some places along the park's Hudson Bay coast until August. Killing frosts can occur during any month in the park. Along the coast, the growing season is too short for tree growth.

There is still much upper flow of cool, dry air from the northwest during summer. Low pressure, cyclonic activity (usually at intervals of three to four days), the result of greater solar radiation, invades the park area from the southwest until early September. This cyclonic encroachment generally produces frontal precipitation. At Winisk, more than half of the annual precipitation, 20.62 inches (52.4 cm) per year, falls between June and September. Almost all of this occurs in the form of rain. July and August, with averages of 3.0 inches (7.6 cm) and 2.8 inches (7.1 cm) of rain respectively, are the months of highest precipitation at Winisk. Well over one-quarter of an average year's total falls at this time. Near the northwestern boundary of the park, annual precipitation is perhaps a little less. Light rain normally falls one day out of three during the summer. Thunderstorms are infrequent, particularly along the coast, because of the stabilizing effect of the cold bay waters.

Climate

Temperature

Precipitation

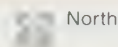
- January mean temperature
15° F (-9.4° C)
- April mean temperature
25° F (-3.9° C)
- July mean temperature
56° F (13.3° C)
- October mean temperature
30° F (-1.1° C)

- Annual snowfall 90" (228.6 centimetres)
- Annual rainfall 20" (50.8 centimetres)

Note: Snowfall and rainfall both decrease from south to north.



1 inch equals 32 miles
1 centimetre equals 20.3 kilometres





Winds at this time of year tend to be variable and light, the lightest of the year, except during the storms of late summer and early fall. Warm, cyclonic offshore breezes from the southwest tend to produce fog along the coast because of condensation caused by the cold bay waters. This, in turn, typically results in a well-developed temperature inversion in the bottom layer of the atmosphere near the coastline. Cool onshore breezes from the northwest, along the Hudson Bay coast, can lift this fog into a low-lying, rolling mixture of cloud and chilling fog which sweeps inland for many miles before it completely dissipates. Because of fog and frontal effects, cloudy skies along the coast occur 75 percent of the time in the Polar Bear Provincial Park area. This figure decreases substantially inland.

Permafrost

A clear indicator of Polar Bear's cold nature is the existence along the Hudson Bay coast of a narrow band of continuous permafrost as indicated in Figure 3. The termination of this tundra strip at the north end of James Bay is the southernmost extension of continuous permafrost in North America. Some authorities, however, suggest that continuous permafrost may occur as far south as Lake River.

Most of the remainder of the park north of 55° latitude is in the zone of widespread, but discontinuous, permafrost. To the south of this region, in the southern fringe of the discontinuous zone, permafrost occurs only where conditions are ideal for its preservation and/or development i.e., where drainage is good, where snow cover is shallow enough not to impair considerable frost penetration during the winter, and where there is good insulation of the soil from solar radiation. Typically, these conditions are met in the southern sections of the park, on micro-relief features in scattered peatland and peat bog locations. In the park region of widespread permafrost, occurrences are also restricted to peatlands and peat bogs. There are probably some large areas south of 55° latitude where permafrost does not occur because of extremely poor drainage. One such place is the vast region of tamarack fen, inland from, and mainly south of Lake River, to the southern boundary.

Bedrock Geology

Precambrian

At a very few places in the park, the older, Precambrian rocks outcrop through the veneer of Silurian sediments, as for example on the Winisk River just north of the 55th parallel. These Precambrian rocks of the Nowashe Formation are between one and two and a half billion years old. This tiny pocket of Precambrian sediment consists of fairly flat-lying, interbedded, grey to pink crystalline dolomite and grey-green dolomitic argillite. The dolomitic beds contain concretions.

To the east of this location, between the Winisk River and Wachi Creek, is another Precambrian inlier: a spectacular, northwest trending remnant of a diabase-gabbro sill, which is especially noteworthy because of the columnar jointing of its outcrop. These are among the youngest Precambrian rocks in the park, one to one and a half billion years old.

On the southern boundary of the park, there are other areas of Precambrian rock covered by glacial deposits. Where samples of these nearly flat-lying rocks of the Sutton Ridges Formation have been examined, their constituents were found to be quartzite, argillite, greywacke, conglomerate and jasper. Chert and possibly a hematite and magnetite-bearing iron formation, and carbonate may be present in these rocks which overlie the Nowashe Formation. A northeast trending fault bisects this area.

All the park rocks are underlain by early Precambrian sediments which have been intruded by granites and granodiorites and metamorphosed into gneisses. These rocks form the so-called Archaean basement complex which is approximately two and a half billion years old.

Paleozoic

Most of Polar Bear Provincial Park is underlain by Paleozoic rocks of Silurian age, approximately 350 million years old. These may be divided into middle and upper Silurian series. The middle Silurian series consists of (from oldest to youngest) the Severn River Formation, the Ekwana River Formation and the Attawapiskat River Formation. The rocks of upper Silurian series, the youngest in the park, are represented by the Kenogami River Formation. These consist of a variety of rock types, mainly limestone and dolomites, but also siltstone, shale, mudstone and sandstone. They are found in the northwestern corner of Polar Bear along the coast in the Shagamu River area. Some of the fossiliferous rock contains corals, brachiopods, stromatoporoids and gastropods. The bedrock geology in the park area is shown in Figure 5.

Bedrock Geology

Paleozoic Silurian

Limestone, dolomite
siltstone, shale, mudstone,
sandstone, and chert.

Precambrian and
Late Precambrian
Diabase sills

Jaspilite, argillite, quartzite,
conglomerate, dolomite,
and graywacke.

Geological boundary

Positive aeromagnetic
anomaly beneath the
Paleozoic: probably Late
Precambrian iron formation
or diabase.

Probably major structural
zone

Possible alkalic complex-
composition unknown and
covered by Paleozoic



1 inch equals 32 miles
1 centimetre equals 20.3 kilometres

North



Structural Geology

The Precambrian rocks in Polar Bear Provincial Park would appear to be part of the Churchill Structural Province of the Canadian Shield, although the boundary between the Superior and Churchill provinces may be only about 4 miles (6.4 km) away from the southern park boundary. The park's shield rocks have been affected by the Hudsonian mountain building period, which ended around 1,640 million years ago.

The Silurian sediments, overlying the Precambrian basement rocks, are shallow over the so-called Cape Henrietta Maria Arch, which extends southwesterly to the Canadian Shield from Cape Henrietta Maria. The sediments deepen on both sides of the arch to over 1,000 feet (305 m) near Lake River. The dip toward Hudson Bay and James Bay is gentle.

Geophysical investigations have revealed the presence of magnetic anomalies under the Silurian rocks in sections of the western half of Polar Bear Provincial Park. These probably include: a major structural zone, likely a fault, from the western boundary of the park, along the southern boundary, to the Winisk River; two areas of what are probably Precambrian iron formation or diabase, south of Winisk; and a possible alkalic complex near the headwaters of Gooseberry Brook.

There is a scarcity of bedrock exposures in Polar Bear Provincial Park, as in most of the Hudson-James Bay Lowlands. The known exceptions are along the Mishamattawa River and Winisk River, Wabuk Point, and the east shore and tip of Cape Henrietta Maria.

Surficial Geology

Pleistocene and Recent

The park landscape has been influenced by glacial activity which began more than 50 million years ago. After the climax of the Wisconsin glaciation, between 18,000 and 20,000 years ago, the continental ice sheet gradually and erratically dissipated to the point where, approximately 7,000 years ago, the park area was free of permanent ice. At its peak, at the centre of the Laurentide ice sheet near the east side of Polar Bear Provincial Park, the maximum thickness of ice was likely close to 10,000 feet (3,048 m). The enormous weight of the ice, plus possible pre-Pleistocene crustal weakness in what is now the Hudson-James Bay Lowlands, resulted in the land being depressed to the extent of about 1,800 feet (549 m) at the centre of ice loading.



During glacial advances, the direction of movement over the park was southwest. The park bedrock was smoothed and polished by the ice and glacial debris. Eventually, as the ice melted, a level blanket of glacial drift was deposited over the area. This consisted of a matrix of blue-grey clay and silt containing minute limestone fragments, unsorted rocks of various sizes and boulders of striated limestone and dolomite and Precambrian gneiss, quartzite and conglomerate. The thickness of this boulder clay varies throughout the Lowlands from a few feet to hundreds of feet. It is well-exposed along the banks of many of the park rivers.

As the continental ice began to melt, in what is now the Hudson-James Bay Lowlands, its place became occupied by the waters of the Tyrrell Sea of which Hudson Bay and James Bay are remnants. The maximum extent of inundation, which corresponds approximately with the boundaries of the Lowlands, occurred sometime between 6,000 and 8,000 years ago. In its wake, the Tyrrell Sea left a conformable layer of almost impervious marine clay over the boulder clay of the Lowlands. The marine clay, which averages about 10 feet (3.0 m), but is as much as 35 feet (10.7 m) deep in some places, is buff-coloured, lighter and sandier than the underlying glacial drift. The marine clay contains fragments of diorite, quartzite, gneiss, jasper, sandstone and limestone, plus marine shells and fossils.

Glacio-isostatic rebound has resulted in the emergence of the Lowlands from the sea ever since an appreciable weight of ice melted from the Laurentide sheet. The process is continuing. In the northeastern section of Polar Bear Provincial Park, which was likely part of the area of maximum ice loading and source of flow, uplift during the last 1,000 years has been taking place at a rapid rate. Although slowing, the uplifting is now just a little less than 4 feet (1.2 m) per century, the fastest rate of emergence anywhere in Eastern and Arctic Canada (Webber, *et al.*, 1970, p. 325).

Since the time of the Tyrrell Sea, probably no part of Polar Bear Provincial Park has been above water much longer than 4,000 years. Areas coastward of the tree line probably have emerged only within the last 2,000 years. The erosional effect of the receding sea accounts for the absence, in Polar Bear, of typical glacial depositional features such as eskers and moraines.



Beach ridges near the Ekwan River



Uplift is responsible for the numerous raised beaches, which extend up to 175 miles (282 km) inland from the coast. Beach ridges are the most noteworthy landforms in the park, and they probably occur in greater concentration in Polar Bear than in any other area of equal size in Canada. Although further substantiation is required, marine beach ridges probably do not occur in any other Ontario park. Ridge concentrations are particularly great between the Winisk River and the western boundary of the park. Between Cape Henrietta Maria and Site 415 lies another massive complex of beach ridges which are remnants of the "old" cape strands which have been accreting during the past 1,000 years.

South of Polar Bear, beach ridges are much less numerous. The strands usually parallel the coast, but irregularities caused by crowding, anastomoses and short, discontinuous ridges provide many exceptions to this generalization. The ridges can vary in length from a few feet to quite a few miles. They are generally about 150 to 300 feet (45.7 to 91.4 m) wide, and average about 3 feet (0.9 m) above the level of the coastal plain although heights of well over 10 feet (3.0 m) are not unknown. The ridges are invariably flat-topped.

Isostatic rebound is continuing in Polar Bear Provincial Park. The present rate of uplift, almost 4 feet (1.2 m) per century, means that the park's already considerable land area is growing, particularly in the region of Cape Henrietta Maria which is probably the "youngest area of considerable size in North America" (Webber, 1972, p. 37). Every year, Polar Bear gains approximately 3 square miles (7.8 km²).

A few examples of frost-patterned ground (regularly-patterned terrain resulting from permafrost action, sometimes in combination with the sorting of sediments, including mud circles and polygons) occur in the park.



Soils

There are two soil regions in Polar Bear Provincial Park: the tundra soils area, whose boundaries are almost identical to those of the coastal physiographic subdivision; and the peat soils area.

Tundra Soils

The tundra and the peat soil regions appear to have much in common. The differences between the two are due to the relatively short time that the tundra soils have had to develop since deglaciation. None of the tundra soils in the park has had much more than 2,000 years to evolve, and the most recently emerged coastal meadows and beach ridges have had considerably less time.

Basically, the tundra "soils" are weathered marine clay with sand and gravel on beach ridges, and thin humus horizons where lichens and heath plants have grown. Otherwise, there is no development of genetic horizons in these youthful soils. Their undeveloped condition is the result of frost heaving and minimal biochemical action because of the short frost-free period and the drainage-impeding permafrost which is common through the tundra soils region of the park, particularly along the Hudson Bay coast. Except on ridges and stream and lake banks, these soils are usually wet, and organic accumulations tend to develop.

Peat Soils

Soil development in the peat soils region of the park is very similar. Wetness and cold have inhibited the development of true soil profiles with genetic horizons. The result is an area covered by sphagnum moss and peat layers which vary in thickness from a few inches to more than 10 feet (3.0 m) in some sections of the Lowlands. The subsoil is impervious marine clay. Where drainage is good on ancient beach ridges and at the edges of lakes and river borders these are greyish brown to dark brown calcareous clay loams containing silt, fine sand and organic material. On old beach ridges, the main soil constituents are gravel and sand.



Hydrology

Because of the low gradient, about 3.5 feet per mile (1.1 m per 1.6 km), and the impervious nature of the marine clay, the drainage system of Polar Bear Provincial Park is very disarranged and inadequate, as indicated by its myriad lakes and muskegs. Also, as a result of melt water and rain water, the park retains almost a 75 percent area of surface water except in very dry years. Polar Bear is a part of the Lowlands which has a greater percentage of surface water than any other section of land of similar size on the North American continent (Coombs, 1954, p.69). Figure 6 indicates major park streams, including those not shown on the base map.

Soil and gradient characteristics are affected by the climate, adequate rainfall, a long period of frost and permafrost, especially near the Hudson Bay coast, thus producing the watery configuration of the park. Sphagnum and peat, abundant over much of the area, tend to retain the water. More water is added along coastal areas during times of spring tides, especially when they coincide with strong onshore winds.

The Winisk River drains a large area outside the park, including a section of the Canadian Shield. During the spring, melting takes place in the headwaters area to the south, before the cold waters at the mouth (near the still solid pack ice of Hudson Bay) begin to break up. This results in an upstream water impoundment which by means of weight, pressure and warm weather gradually works its way north to the mouth. During this time, the Winisk and many of the other park rivers overflow their inadequate banks, turning the surrounding land into a veritable silt-laden lake. River water is augmented by snow melt and precipitation.

The present, basically deranged drainage system has only been in existence since the park's emergence from the sea. In some places, though, the short consequent streams, which developed at right angles to the coast, exhibit a parallel pattern which is especially noticeable north and south of Lake River on the James Bay coast. In the muskeg and small lakes region, the drainage often tends to be radial. Some rivers, like the Winisk, are sometimes quite deeply incised with a small "valley" which contains little more than the immediate channel. This results in cliff-like banks of close to 50 feet (15.2 m) in places along the Winisk. Although larger park rivers, such as the Winisk and the Sutton, have their headwaters outside the park, many smaller streams – Little Shagamu River, Wood Creek, Towers Creek, Duck Creek, Big Owl Creek and others – have their complete drainage systems within Polar Bear's boundaries. Some other streams which are partly inside the park are Shamattawa River, Wachi Creek, Shell Brook, Shagamu River, Mishamattawa River, Burntpoint Creek, Kinushseo River, Brant River, Lakitusaki River, Opinagau River, Patchepawapoka River and Nowashe Creek.

The numerous small lakes in the park are all post-glacial and owe their existence to one of four mechanisms. Most occupy shallow depressions which were gouged out by glacial erosion. Others, which lie over a deep mantle of till, are probably kettle lakes. Slot lakes, common in the coastal zone, are the result of the damming effect of beach ridges which typically occur at right angles to the direction of the drainage. Areas of karst development are possible and in this case some small lakes and ponds are of the sink-hole variety.

The park's lakes are small, usually less than a mile in length. The largest, Big Shagamu Lake, is 8 miles (13 km) long and over 3 miles (5 km) wide in places. Most of the lakes display a rounded or oval outline. Islands are rare. Virtually all of the lakes in the park are shallow and the deepest is probably less than 10 feet in depth (3.0 m). Many are filling with vegetation. Some of the deeper lakes, notably those near the western boundary of the park, centred around Big Shagamu Lake, are undergoing a process of enlargement by means of lake capture or piracy. Bank undercutting by wave and ice erosion in larger lakes sometimes results in excavating into or coalescing with another lake. These "cave in" or "coalescent" lakes are often characteristic of emergent coastal plains.

The hydrographical picture of the park, however, is dominated by the vast tracts of muskeg which comprise much of the interior of Polar Bear.

Parallel to the James Bay and Hudson Bay coasts, particularly wherever beach ridges are absent, is a narrow strip of tidal marsh. This usually begins several hundred feet beyond the high tide line and stretches from 200 yards (183 m) to about half a mile (0.8 km) inland. The water in these marshes is often brackish.

Tides and Currents

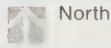
Like the Baltic Sea and most other largely enclosed water bodies, the tidal range in Hudson Bay and James Bay is small. However, because of the low land gradient, tidal influence along the Polar Bear coasts is always apparent. This is especially true when a strong wind aligns itself with a spring flood or ebb tide. Strong tidal currents can be produced in the funnel-shaped estuary of the Winisk River under these conditions. The coastal waters have a general counterclockwise movement.

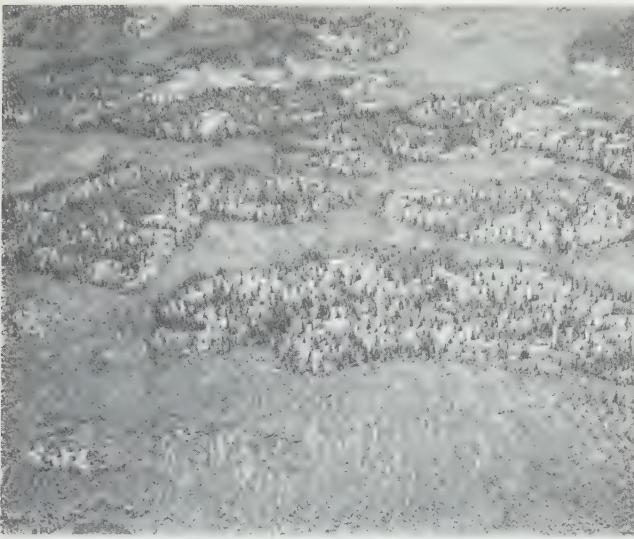
Streams

- | | | | | | |
|---|----------------------|---|------------------|----|----------------------|
| 1 | Shell Brook | 5 | Burntpoint Creek | 9 | Big Owl Creek |
| 2 | Little Shagamu River | 6 | Black Duck River | 10 | Patchepawapoka River |
| 3 | Wood Creek | 7 | Towers Creek | 11 | Nowashe Creek |
| 4 | Ministik Creek | 8 | Duck Creek | | |



1 inch equals 32 miles
1 centimetre equals 20.3 kilometres





Physiography

Topographically, the park is part of the low, flat, sodden coastal plain of the Hudson-James Bay Lowlands, as shown in Figure 7. It may be divided into two physiographic subdivisions: (1) the coastal area, and (2) the muskeg and small lakes area. The coastal area is the very flat, essentially treeless area along the coast, from the tidal flats to between 5 and 10 miles (8 to 16 km) inland. The coastline is relatively straight, a characteristic of low, emergent coasts. The high tide mark is usually delineated by driftwood, often on storm beaches.

The storm beaches and the fossil gravel ridges, which are found further inland, are the only areas of elevation and comparative dryness throughout most of the coastal area. The sole exception is the diabase hill, west of Wachi Creek, which is the highest point in the park even though it is only a few hundred feet above sea level. Occurring very often, and separating many of the beach ridges at right angles to the direction of the drainage are the shallow, elongated, so-called "slot" lakes. Where these are very close to the coast, they are often brackish.

The muskeg and small lakes area, or the inland section of Polar Bear Provincial Park is the very flat, wet country so characteristic of most of the Hudson-James Bay Lowlands. Drainage is highly inadequate.

The muskeg area includes a great part of the park west of Wachi Creek and most of the park south of 54° 30' latitude. Only 10 percent of the region is dry enough to support tree growth (Coombs, 1954, p.7). Such areas are mainly along lake and river borders and on beach ridges. Many of the lakes are close to being filled with sediment and organic matter. The rivers occupy vertically-sided trenches rather than true valleys. The incised valleys are a result of the rapid uplift and down cutting. Tributaries, which are usually at right angles to the rivers, generally appear in the muskeg a few hundred yards from the river.

The small lakes area makes up the remainder of the park, i.e., that region which is not part of the coastal or muskeg zones. It is an area of many small, shallow ponds and lakes, closely bunched together, and often, only separated by narrow strips of land. Such strips are sometimes tree-covered because of their elevation and consequent drainage provided by ice and wave action.

Flora

Polar Bear Provincial Park falls within two major vegetation regions: (1) the transition forest, and (2) the treeless or tundra area, as indicated in Figure 8.

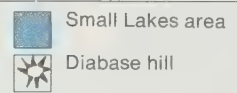
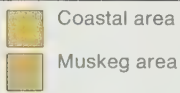
The Transition Forest

The transition forest is the northern section of the boreal forest. Its components are typically boreal except that tree growth tends to be stunted. In the park, aspen (*Populus tremuloides*), white birch (*Betula papyrifera*), jack pine (*Pinus Banksiana*) and balsam fir (*Abies balsamea*) are absent or very rare. The common trees and shrubs are black spruce (*Picea mariana*), white spruce (*Picea glauca*), larch (*Larix laricina*), balsam poplar (*Populus balsamifera*), dwarf birch (*Betula glandulosa*) and a variety of willows (*Salix* spp.). The trees and shrubs grow on numerous sites, which vary from well-drained stream banks, lake borders and raised marine features, where tree growth is good, to the margins of low, water-soaked open bog where trees can seldom exist.

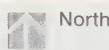
Better drained sites, such as old beach ridges, typically support mature white spruce forests with an understory of heath plants such as crowberry (*Empetrum nigrum*) and mountain cranberry (*Vaccinium Vitis-idaea*). Openings on the ridges occur with increasing frequency as one travels northward in the transition area. They are usually carpeted with a deep mat of caribou lichen or reindeer moss (*Cladonia* sp.).

Very occasionally, balsam poplar and shrubby growths of small spruce, willow and blueberry (*Vaccinium uliginosum*) are found in, and at the perimeter of, such open areas. Of Polar Bear's plant communities, these lichen woodlands are the most apt to be ravaged by wild fires because of their comparatively dry, exposed aspect. Near stream banks, where drainage is also good, white spruce and balsam poplar are the prevalent tree species. With balsam poplar this is particularly the case on some of the larger streams west of, and including the Winisk, on the richer alluvial sites and on areas which have been burned.

Physiographic Subdivisions



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1 centimetre equals 20.3 kilometres





Where drainage is poorer, black spruce and tamarack become the dominant tree species. In many bog locations, stunted black spruce grow together with heath plants, sedges (*Carex* spp.), cotton grass (*Eriophorum* sp.) and sphagnum. In such places, sphagnum accumulation may be as much as one third of an inch (0.9 cm) per year. Fens, which topographically appear quite similar to bogs, have a richer flora than bogs because of nutrients, especially lime, which are available to the plants from the mineral soil via ground water percolation. Tamarack forests are characteristic of the drier sections of many park fens. Wetter areas are treeless. Much of Polar Bear Provincial Park inland and south of Lake River is fen country. When such areas are burned, paludification generally ensues and the burnt section reverts to a wet, open, treeless expanse.

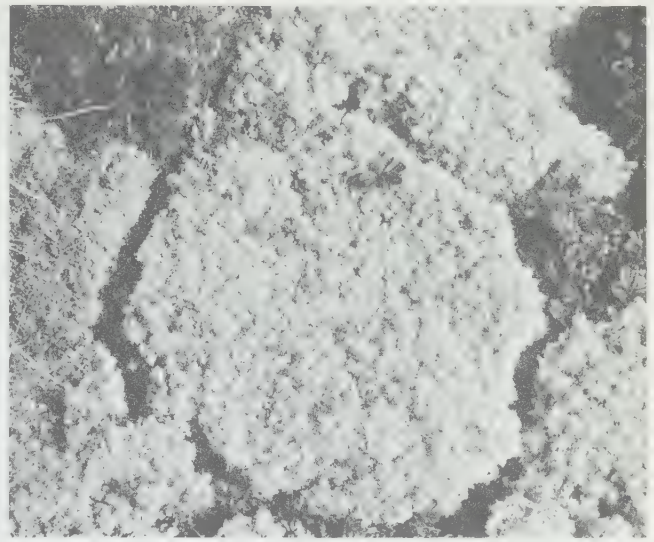
Except along the Winisk River, near the community of Winisk, and the Lakitusaki River near Lake River, where "secondary" forests have developed to a minor extent as a result of tree cutting for fuel and construction, almost all of Polar Bear Provincial Park is genuine virgin land from the standpoint of its vegetation.

The Hemiarctic

Separating the transition forest from the treeless tundra area is a poorly defined mosaic of forest and tundra, termed "forest barrens" or "forest tundra". This "hemiarctic" ecotone is almost nonexistent near the west bank of the Sutton River, while northwest of Lake River it is close to 15 miles (24.1 km) wide. Its main forest components are white spruce, tamarack and willow. Reindeer lichens grow profusely throughout the drier, more open, forested sections.

The Tundra Area

Of surpassing interest in any analysis of Polar Bear Provincial Park is its low arctic, treeless region, which is probably one of the most temperately located extensions on the mainland in the world. In the park, the distance of the tree line from the coast varies from about 20 miles (32.2 km) southwest of Cape Henrietta Maria to almost at the coast near the mouth of the Sutton River. The location of the tree line is controlled by a combination of edaphic factors, uplift and climate, except in the Cape area where climate alone appears to be the paramount influence. Recently emerged land generally has not had long enough to develop sufficiently good soil and drainage characteristics to support tree growth. The tree line is not static but fluctuates in response to changes in climate and/or uplift.



Near the tree line, species such as willow and ground birch assume a dwarf or ground-hugging aspect. Black spruce often grow in a candelabra configuration where branches from the same plant grow laterally along the ground until a leader is sent up. This section of the plant frequently develops its own root system and becomes a self-sustaining unit.

Much of the flora in the park's treeless region may be classified as low or southern Arctic. However, some plants, which are more typical of high Arctic regions, have been found in the park area. These include the sedge (*Carex subspathacea*), goose grass (*Puccinellia phryganodes*), and the lovely, pale yellow *Saxifraga Hirculus*.

Wet areas above the tree line in the park are dominated by sedges such as cotton grass and clumps of ground birch. Vegetation on drier sites, especially on old ridges, is usually of the tundra heath variety. Here, a strong, low arctic element is represented by the shrubby, magenta-shaded, aromatic, Lapland rosebay (*Rhododendron lapponicum*), the ubiquitous crowberry, blueberry, and mountain cranberry. Cloudberry (*Rubus Chamaemorus*), from which a delicate tasting liqueur is made in Finland, grows on turfy, slightly moister sites at the edges of, or in the depressions of, beach ridges.

Tundra herbs grow mainly on the drier sites and include the beautiful Arctic or mountain avens (*Dryas integrifolia*), a number of pea family representatives: *Hedysarum Mackenzii*, an aggressive colonizer of new beach ridges; milk-vetch (*Astragalus* sp.), whose roots are edible; and *Oxytropis hudsonica*. The saxifrages include yellow saxifrage (*Saxifraga aizoides*), yellow marsh saxifrage (*S. Hirculus*), purple saxifrage (*S. oppositifolia*) and prickly saxifrage (*S. tricuspidata*). Also present are louseworts, more charitably described as fernweeds (*Pedicularis labradorica* and *P. sudetica*), whose roots are edible and nutritious.



Caribou trail through lichen-spruce tundra



On old beach ridges, these plants appear to be growing in a virtual matrix of lichens, especially the *Alectoria* and the reindeer mosses or Caribou lichens (*Cladonia rangiferina* and *C. alpestris*) and *Cetraria nivalis*. Crustose lichens are rare, but one, orange star (*Caloplaca elegans*), grows abundantly on the limestone fragments which litter the tundra. During the early summer, the blooms of the heath and herb plants of the lichen heath are ablaze with colour. On southern slopes at the periphery of the lichen heath as it grades into wetter tundra, and along stream banks and lake edges willow thickets are common. Protection from the wind and the winter insulation provided by snow accumulation in these locations allow a common park willow such as *Salix planifolia* to grow to heights of 8 feet (2.4 m). Dwarf birch is also a frequent component of such places, along with the sweet-scented Lapland buttercup (*Ranunculus lapponicus*), the white anemone (*Anemone parviflora*), sedges, and grasses such as reed bentgrass (*Calamagrostis neglecta*) and cotton grass (*Eriophorum angustifolium*).

Most of the Polar Bear area has been open for colonization by plants only during the past 4,000 years. Many places have been above water for less than half that time. Because of this recent emergence, no endemic species appear to have evolved. Most of the boreal colonizers apparently came from the south and the southwest, as did a number of the arctic species, but more than a few of the tundra plants have invaded from areas to the northwest, in Alaska and the Yukon, which were unglaciated during Pleistocene times. The plants in question possibly were able to expand their ranges to the south because of their plumed seeds and the prevailing west-northwest winds. Possibly some of the willows and mountain avens reached Polar Bear in such a manner. Prickly saxifrage likely arrived in much the same way.

Plant colonization along the park's emergent coast is exemplified by an interesting line of succession as one moves inland from one beach ridge to the next. At the coast itself, including lagoons, salt marshes and brackish slot lake edges, grasses such as the aquatic *Arctophila fluva* and goose grass grow with sedges, cotton grasses and marsh herbs such as Pallas' buttercup (*Ranunculus Pallasii*) on drier locations. On the youngest beaches, vegetation is sparse and in some cases, nonexistent. Typical species are sea-lungwort (*Mertensia maritima*), lyme grass (*Elymus grerarius*) and sea-beach sandwort (*Arenarius peplodes*), whose young shoots are edible.



Lichens do not appear until the second or third beach ridge in from the coast, which means that these have been above water for at least 70 years. Further inland, willow, buffalo berry (*Shepherdia canadensis*), crowberry, Lapland rosebay, blueberry, mountain avens, prickly saxifrage and lichens become increasingly common. A few miles inland as one approaches the tree line, spruce and tamarack begin to appear on the protected south-facing slopes of beach ridges. South of the tree line, mature spruce-lichen woodlands develop on the ridges.

Vegetation Patterns

Thirty-three different types of vegetation patterns have been identified in the park, including sub-arctic polygon muskegs and fens. These peculiar polygon-shaped tracts usually consist of low areas and pools separated by forested peat ridges. They mark the northern limit of the transition forest in a broad band, from a few miles to almost 15 miles (24.1 km) wide, some miles west of the Winisk River. This strip stretches northwest past the western boundary of the park. Its northern edge varies from about 5 miles (8.0 km) to more than 10 miles (16.1 km) from the coast.

Another interesting vegetation landform is "palsas" (from the Swedish word *palsen*). These features are roughly circular mounds of peat about 65 feet (19.8 m) in diameter, but often larger, and averaging 10 feet (3.0 m) high. They contain permafrost and are found in bogs.

Fresh Water Flora

Little is known of the fresh water flora of Polar Bear Provincial Park. From the air, one of the more striking features of the many ponds, which dot the park landscape, is the variety of colours, rusts, yellows, greens, turquoises, blacks, near-whites and browns. Very often a lake's distinctive colour is the result of plant micro-organisms. Common also are plants such as the water-loving buttercup (*Ranunculus hyperboreus*), a tundra species, and the aquatic mare's tail (*Hippuris vulgaris*). Other common aquatics include some of the sedges (*Carex* spp.), water-milfoils (*Myriophyllum* spp.) and the pondweeds (*Potamogeton* spp.).



Vegetation and Climate

The severe climatic effects produced by the two great bays push the tree line in the James Bay area farther south than in any other continental area in the Northern Hemisphere. Coastal air temperatures are reduced by the pack ice and cold water during the spring and summer because of the prevailing onshore winds along the Hudson Bay coast of the park, and the high incidence of fog and cloud eliminate much solar radiation. This is particularly true at Cape Henrietta Maria which is exposed to the sea on both sides.

The very slight, moderating effect of the bays during the fall has negligible effect on vegetation. Early frosts occur along the coast, and growth halts as the days become shorter and the nights cooler. The combination of flat terrain with wind-driven sand, snow and salt spray along the coast impose severe hardships upon vegetation, particularly to vertical growth because of mechanical and chemical damage to plants. Abrasion by the hard, angular, gritty snow of mid-winter can be especially devastating to vegetation exposed above the snow surface. Near the tree line, communal tree growth causes an eddy effect which reduces wind speed enabling additional trees to grow in the lee of the clump.

Plant root systems are shallow in the tundra section of Polar Bear Provincial Park because of the inhibiting presence of permafrost.

The spruces and larch have very similar tree lines although white spruce, usually accepted as the tree line delineating species, appears to be hardier and better adapted to a wider variety of habitats near the limit of its range. White spruce grows higher than black spruce and seldom assumes the candelabra form. White spruce one to two feet (less than a meter) high, south of Cape Henrietta Maria, have been aged at 50 to 60 years. The lack of certain soil nutrients is also a factor which tends to limit growth. When extra nutrients are supplied, as they are around fox dens, the response of the plants so favoured is usually impressive.



Fauna

As indicated in Figure 8, Polar Bear Provincial Park falls within two major life areas – the Arctic and the Hudsonian. Such a zonation applies particularly to terrestrial animals.

Insects

The poor drainage, which characterizes so much of the park's landscape, helps to produce nearly ideal breeding areas for the abundant biting flies which are active from June until early September. Because of its wide distribution and the duration of its active period from late June until early September, the mosquito is the most notable or infamous insect pest. But it is followed closely by blackflies, members of the tabanid tribe (deerflies and horseflies) and biting midges ("no-see-ums" or sandflies). North of the tree line, mosquitoes are the major problem, although locally on warm, humid July days in the lee of riverbank willows, blackflies and tabanids can cause discomfort.

Mosquitoes in this section of Ontario can be more than just a nuisance. Five million of these insects may occupy one acre (0.4 ha) of land (Oliver, 1960, p.423). In such concentrations, an unprotected individual might sustain almost 10,000 bites in a minute. At this rate, theoretically, it would be possible for a person to lose half the body's blood volume in less than two hours.

Allergic reactions to insect bites can be fairly severe with some people until their systems develop a degree of immunity. The psychological effect of insect noise, bites and body reactions can be debilitating in terms of morale and efficiency. However, the park's mosquito populations do not appear to be human disease carriers as are many of their kind in more temperate areas. The small but tough mosquitoes which live north of the tree line, are capable of biting (sucking) at temperatures as low as 5.6°C, whereas more southerly species cease to be active several degrees above this temperature. Obviously, repellent, protective clothing and screening or netting are essential for travellers in Polar Bear Provincial Park during its warm season.

Not all of the park's insects are pests. A number of butterflies, including members of the genus *Oeneis* and the species *Boloria eunomia*, the bog fritillary, and the arctic *Colias pelidne* have been found in Polar Bear. Very little lepidopteral work has been done in this interesting faunal area, and there must surely be at least a few species present in the park which have not yet been recorded. For example, in July, 1969, after less than an hour's collecting at the Brant River, the butterfly *Agriades glandon* was taken for the first time in Ontario.

Natural Vegetation Regions
and Life Areas

Natural Vegetation
Regions

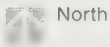
- Treeless Region
- Transition Region
- Approximate Location of
Arctic Tree Line

Life Areas

- Arctic Area
- Hudsonian Area



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1 centimetre equals 20.3 kilometres





Fish

The aquatic fauna of the park has not been particularly well studied. Polar Bear's cold climate and its recent emergence from the sea have resulted in a paucity of fish species in park lakes and streams. Growth is retarded because of the cold and generally low nutrient levels. Of the fish species which occur in the park, some, such as brook trout (*Salvelinus fontinalis*), are anadromous. Each spring, after break-up, many of these fish swim downstream, from the fresh waters where they spent the winter, to forage in the river mouth and estuaries which abut Hudson Bay and James Bay. By mid-August, most of these fish begin a leisurely return up the streams.

As the two bays are considerably less saline than the Atlantic Ocean, they can almost be thought of as an estuarial region in their own right. However, whether or not anadromous fish spend any time in the deeper offshore bay waters is not known. That they travel from one drainage system to another via bay coasts, though, is a fact. Two tagged brook trout from the Sutton River were later caught in the Winisk River a number of years ago. The mouths of these rivers are separated by 55 miles (89 km) of Hudson Bay water.

In 1955, almost half a million chum salmon (*Oncorhynchus keta*) eggs were planted in the Winisk and Mishamattawa rivers, but no adult specimens have ever been taken in the area. As a matter of record, arctic char (*Salvelinus alpinus*) have been caught near the park in the Winisk River in 1961 and 1962. It seems probable that they occur even further to the east and south, but they are not an important species in the park. The game fish which commonly occur in park lakes and streams are brook trout (in many of the streams, especially along the Hudson Bay coast), northern pike (*Esox lucius*), which is found in some of the larger rivers, the walleye or yellow pickerel (*Stizostedion vitreum*), which occurs at least in the Winisk River drainage system in the park.

Amphibians and Reptiles

Four amphibians occur in Polar Bear Provincial Park, the Hudson Bay toad (*Bufo americanus copei*), the boreal chorus frog (*Pseudacris triseriata maculata*), the wood frog (*Rana sylvatica*) and the leopard frog (*Rana pipiens*). The northern spring peeper (*Hyla crucifer crucifer*) and the mink frog (*Rana septentrionalis*) are also probably within the park. There is a possibility that one reptile, the eastern garter snake (*Thamnophis sirtalis sirtalis*) inhabits some parts of the park.



Birds

Between June and September, the coastal regions of Polar Bear are alive with birds. Most of the remainder of the year, birds are comparatively rare. A few species such as the raven (*Corvus corax*), the willow ptarmigan (*Lagopus lagopus*), and the snowy owl (*Nyctea scandiaca*) are probably year-round residents.

The migratory birds, which invade the park in the early spring, have not had to develop the anatomical and physiological adaptations necessary for birds to live year-round in arctic and sub-arctic surroundings. However, these creatures are able to condense courting and in some cases, nesting, egg laying, hatching and molting into a much shorter period than species located in more temperate areas.

A park bird which admirably exemplifies these capacities is the lesser snow goose (*Anser caerulescens*). This, the world's most abundant species of goose, begins to leave its wintering grounds in the Gulf of Mexico around the end of February. By the second half of May, in good years, many of these birds have reached the coastal areas of Polar Bear Provincial Park. Almost all the coastline becomes a staging area for hundreds of thousands of the geese until early June when most carry on northward to their now habitable, traditional breeding grounds.

Some lesser snow geese remain in the park. Over 20,000 pairs nest along the coast from the mouth of the Brant River to the Black Duck River, east of Cape Henrietta Maria. This is the southernmost, regularly used, snow goose breeding colony of any size in the world and unquestionably the surpassing ornithological spectacle of the park.

The gregarious birds raise their young at once. They are usually paired on their wintering grounds so that no time is spent in mate selection. Nesting takes place a few days after their arrival in unsheltered, grassy areas within a few yards of water. Nests are particularly numerous within a half mile of the coast, on tiny islands, and near the shores of the little ponds and lakes which dot the grass tundra expanses.



Snow geese



Incubation averages about 23 days. Two to seven, with an average of four, eggs are laid in each nest. Very shortly after the young birds have hatched and dried, the families abandon the nesting area in search of new places to browse on the sedges which are their dietary staple in the north. Forty miles (64.4 km) may be covered by the new families in a week's time. The young birds grow at the astonishing rate of almost a pound (0.5 kg) per week for the first month of their lives. At the end of this time, they may weigh almost half as much as an adult (Cooch, 1968, p.455). All the geese are flightless until molting is over. Non-breeders are the first to molt. New flight feathers are grown by early August.

By late September, the fall migration is well on its way, and almost all the birds are gone by the end of October. During the autumn, much of the park becomes a staging area in what is truly one of the more impressive wildlife spectacles to be seen anywhere as hundreds of thousands of snow geese prepare to leave the Hudson Bay area.

The lesser snow goose breeding colony near Cape Henrietta Maria was first reported in 1947. Since that time it has grown rapidly. Over 17,000 birds were estimated to be present in 1957, while close to 100,000, the largest ever for this colony, has been suggested for 1975.

There is a strong arctic element in the avifauna which nests north of the tree line in the park. Although less than 50 percent of these species are regarded as arctic breeders, it is also true that none is really temperate area nesters. Some of the park's arctic breeding species include the arctic loon (*Gavia arctica pacifica*), the oldsquaw (*Clangula hyemalis*), the king eider (*Somateria spectabilis*), the willow ptarmigan, the northern phalarope (*Lobipes lobatus*), the parasitic jaeger (*Stercorarius parasiticus*) and the Lapland longspur (*Calcarius lapponicus lapponicus*). Waterfowl are very abundant in the park. Black ducks (*Anas rubripes*) and pintails (*Anas acuta tzitzioha*) are probably the most common ducks in most areas, especially along the coast.



Some rather rare birds have been reported in and near the park. A pair of golden eagles (*Aquila chrysaetos canadensis*) were said to have been seen nesting in a tree, inland from Cape Henrietta Maria, by a Cree informant from Lake River in 1939. Remains, presumably from the same location, were found the preceding year. Cree people from Winisk also report that this bird nests about 4 miles (6.5 km) in from the coast, halfway between the Little Shagamu River and Wood Creek. The rare and beautiful gyrfalcon (*Falco rusticolus obsoletus*) is an infrequent visitor to the park. The bird has been sighted west of the Brant River near the coast (1957), and a specimen was taken in the fall of 1971 near Winisk. The latter individual impaled itself on a willow while diving at a ptarmigan. Duck hawks or peregrine falcons (*Falco peregrinus anatum*) have also been reported from the Brant River mouth and the Sutton River area.

The coastal region of the park abounds with many varieties of shorebirds during the warm months. Some of these birds are among the earliest to leave for the south. Pectoral sandpipers (*Erolia melanotos*), semipalmated sandpipers (*Ereunetes pusillus*) and yellowlegs (*Totanus* spp.) have been observed grouping for migration as early as mid-July.

Mammals

Terrestrial mammals are year-round residents of the park. In one way or another, all have adapted to the region of sub-arctic and arctic climates. Species such as polar bears (*Thalarctos maritimus*) have warm coats, reduced extremities and skin surfaces which can cool to almost freezing temperatures without sustaining damage. Other mammals have developed anatomical aids for walking in snow. The large furry paws of the Canada lynx (*Lynx canadensis*), the splayed hooves of woodland caribou (*Rangifer tarandus caribou*) and the long legs of moose (*Alces alces*) are some of the more obvious examples. Polar bears do not hibernate, but many, particularly denning females and cubs, spend much of the cold period in a state of inactivity. Most small mammals stay under the snow for a great part of the winter. Because of the excellent insulating properties of snow, these animals seldom experience temperatures below 0°F (-17.8°C) and most importantly they are protected from the ravages of wind chill. Beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*) and otter (*Lutra canadensis*) all have winter dens affected by the warming influence of water (Macpherson, 1968, p.478).



The following sea mammals visit the coastal and estuarial sections of Polar Bear Provincial Park: the walrus (*Odobenus rosmarus*); probably, the harbour seal (*Phoca vitulina*); probably, the ringed seal (*Phoca - Pusa - hispida*); the bearded seal (*Erignathus barbatus*); and the white whale or beluga (*Delphinapterus leucas*).

Walrus congregate on a small shoal in Hudson Bay about 12 miles (19.3 km) due north of the mouth of the Brant River particularly during the month of August. This was thought to be the southernmost area of congregation for walrus in the Hudson-James Bay area, but it has been reported that these mammals have been seen on shore on the east side of Cape Henrietta Maria, and as far south as Ekwan Point.

Bearded seals sometimes enter rivers for a short distance. The large males weight 500 to 1,000 pounds (226.8 to 453.6 kg). This seal is a solitary animal, reported to feed on whitefish as they enter rivers en route to their freshwater spawning areas. Individual seals can sometimes be seen "hailed up" on gravel bars at river mouths.

White whales are the only arctic porpoise with the exception of killer whales. They occur commonly in the Winisk area and along the western park coastline. After breakup, the whales enter the estuaries of larger rivers, such as the Winisk and Sutton-Kinushseo, in search of river fish. In such places, pods of many dozens of the animals, seen from the air, can provide a memorable sight. By whale standards, beluga are small, reaching 12 or 13 feet (3.78 or 4.0 m) in length and weighing up to 4,000 pounds (1,814 kg). The young of the Hudson Bay population are born slate blue, but by four years they have turned a milk white.

In 1949, the remains of a narwhal (*Monodon monoceros*) were found washed up near the high tide mark at Wabuk Point near Winisk. This most arctic of whales has been seen as far south as Moosonee.

The following furbearers occur in the park: beaver, which use willow for dam construction and food north of the tree line; muskrat; timber wolf (*Canis lupus*) including a light-coloured race (*Canis lupus hudsonicus*) which is somewhat larger than animals farther to the south; arctic fox (*Alopex lagopus*); red fox (*Vulpes vulpes*); black bear (*Ursus americanus*); polar bear; ermine (*Mustela erminea*); least weasel (*Mustela rixosa*); probably mink (*Mustela vison*); marten (*Martes americana*); fisher (*Martes pennanti*); wolverine (*Gulo luscus*); striped skunk (*Mephitis mephitis*); otter; and Canada lynx.



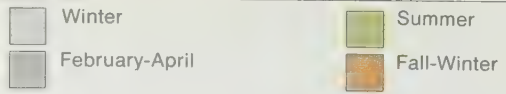
One of the most important mammals of Polar Bear Provincial Park is the woodland caribou. The only other member of the deer family in the park is the moose, which is found in wooded sections south of the tree line and occasionally along willow-fringed creeks in the tundra section. Approximately 7,000 caribou, possibly more than half the total provincial population, live in the Ontario lowlands north of the Attawapiskat River.

In late spring, some of these animals migrate to the tundra region, most of which is in the park. In these treeless places, largely free of tormenting deerflies and horseflies, the caribou graze on their favourite summer fare – willows, *Cladonia* and *Cetraria* lichens, cotton grass, horsetails (*Equisetum* spp.) and ground birch.

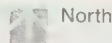
A particularly good summer caribou location in the park lies north of a line which commences about 10 miles (16.2 km) south of Hook Point on James Bay and runs over to approximately the mouth of Burntpoint Creek on Hudson Bay. Near Hook Point itself, as many as 350 animals have been seen in the large herd which regularly visits there. Herd composition during summer consists largely of cows, calves and occasional yearlings. Stags are usually solitary. In the autumn, most of the caribou group for the rut and gradually move back into the trees to their wintering areas. These places, which support large herds for much of the coldest season, lie mainly to the south of Polar Bear, but one sizeable and important range is situated west and north of Lake River, entirely within the park. Another is located in the Big Shagamu Lake area. Here, the animals continue to feed on ground lichens, grasses, sedges, tree lichens, particularly *Cetraria* spp., and bog birch. The caribou are able to paw the soft snow in search of these plants (except tree lichens), something which is often impossible in the hard-packed snow north of the tree line.

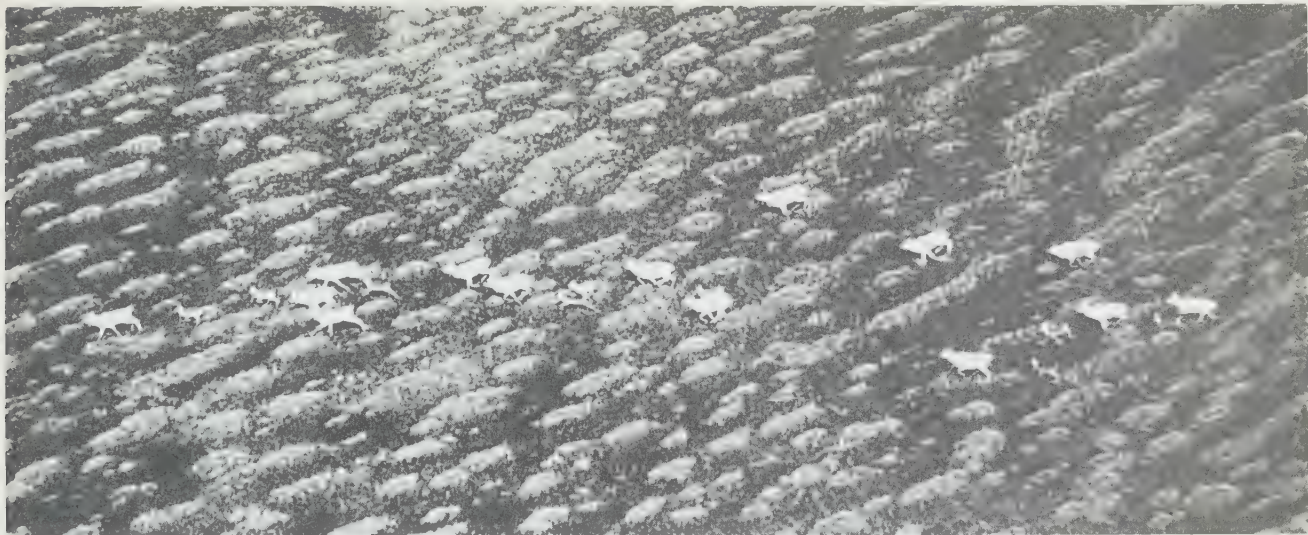
In the late winter, from February to April, as weather conditions begin to moderate, some of the caribou from the Lake River wintering ground begin to move north above the trees to an area several miles inland from Hook Point. These animals feed on plants which have been exposed by driving winds on the crests of old beach ridges. By May, the herds begin to fragment into smaller units and spread north to take advantage of newly snow-freed plants. Pregnant cows in particular tend to become solitary until their calves are born. The seasonal concentration of caribou in the park is shown in Figure 9.

Caribou Seasonal Concentrations



1 inch equals 32 miles
1 centimetre equals 20.3 kilometres





Caribou numbers in the park area seem to be quite stable. In fact, it is possible that they have increased slightly during the past 40 years. Some animals are shot each year, especially between November and April, by native people from nearby villages. However, the greatest threat to caribou well-being is probably forest fires and over-utilization of tundra feeding areas. During periods of extreme drought (such as those which occurred in the 1930s and the late 1950s), lightning and man-started fires can burn vast tracts of good caribou habitat since dry lichen is an excellent fuel. Such a calamity is a very real threat to caribou well-being as it may take hundreds of years for burned areas to become re-established in bog sites because of the palludification which generally follows fires in such places. Although re-establishment of lichens on old beach ridges would take considerably less time, the affected area would be unavailable for good grazing during the lifetime of a generation of caribou.

Among the park's mammals is of course its namesake, the polar bear, one of the world's largest carnivores. Black bears also occur in the park – even above the tree line, where they have been seen at the Black Duck River and Brant River. Cree people from Winisk also report having seen what they thought to be a grizzly bear (*Ursus arctos horribilis*) near the east side of Big Shagamu Lake in the west end of the park a number of years ago. More probably this was a brown-phase black bear.

Polar bears, like the arctic fox and the sea mammals, underscore the rather strong arctic element in the park's mammalian fauna. The number of polar bears estimated to be in the park varies from time to time. Estimates of 200 animals for Ontario at peak times have been made, although some authorities would venture a figure much larger than this. The park's polar bear population is likely to be smallest in the late spring. As the ice pack begins to fragment and melt, the male bears begin to come ashore. Others, travelling on ice flows, reach or come near land when their ice pans, swept by the prevailing northwest winds and the counterclockwise current of Hudson Bay, run aground on or pass by the coast between the mouth of the Sutton River and Cape Henrietta Maria. From July to November, the bears congregate along the headlands, shoals, foreshore areas and islands of the coast, foraging for grasses, lichens, berries, small mammals, flightless waterfowl, seaweed, marine invertebrates and carrion such as dead seals and whales. The bears are indolent during much of the summer. Few bears frequent the coast south of the park's southern boundary.

A unique characteristic of the polar bears of the southern Hudson Bay region and the islands of James Bay is that they construct summer and fall dens and resting pits. These are often located near the coast on islands and beaches and on the higher banks of inland lakes. They have diameters of 5 to 10 feet (1.5 to 3.1 m) and may be from 1 to 20 feet (0.3 to 6.1 m) deep. Some of the longer ones have probably been in use for hundreds of years. Deep dens usually terminate at permanently frozen ground where the bear can retreat from the sun and keep reasonably cool. Summer dens are constructed and used from July to October.

By late October, before Hudson Bay and James Bay are frozen over, bears other than pregnant females congregate along many of the coastal headlands, flats, islands and shoals. Between Little Cape and Cape Henrietta Maria, densities of one bear for every 4.2 miles (6.8 km) have been observed, the highest for the province. As the two bays begin to freeze over by mid-November, the bears leave the coastal areas and walk out along the new ice to leads and open-water areas in search of ringed and bearded seals. It is no exaggeration to say that the welfare of polar bears depends upon the availability of seals.

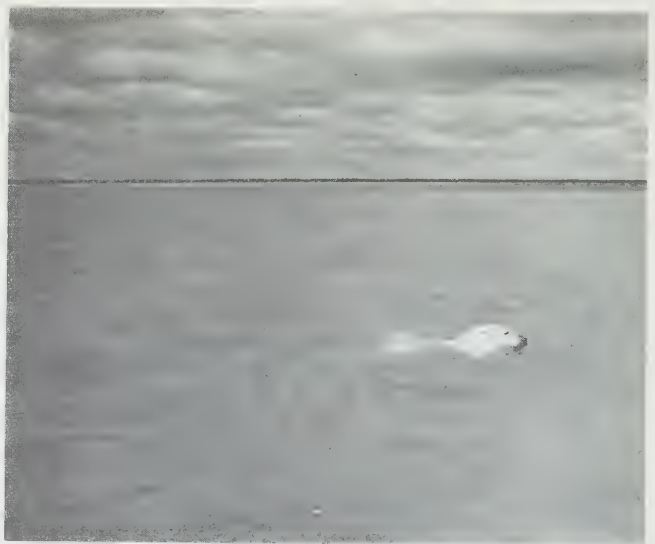
In the fall, pregnant females begin wandering inland to den. The protection afforded by a maternity den is necessary for the successful reproduction and survival of the young. Polar bear maternity denning seems to occur in a rather broad area across Northern Ontario (Figure 10). Sporadic denning sites were identified within this band during the 1974-1976 surveys. Difficult to locate, the dens are usually high, steep banks along streams and lakes and peat hummocks, particularly on the southeast side of lakes where snow drifts will form. An important maternity denning area is located inland from the coast between Winisk and Fort Severn, in the Big Shagamu Lake area. Some dens along the Winisk River are as much as 105 miles (168.9 km) in from the coast, while others may be less than 20 miles (32.2 km).

The cubs, normally two, are born in late December or early January. Cub production from the Ontario mainland is usually more than 50 animals per annum. On the basis of survey work done in March and April 1975, the park area west of Winisk appears to be of particular importance. The family may leave the den as early as late February usually for short periods only. By March, most families have left their dens to make their way to the coast and leads and open water areas. By the end of April, most families are out on the ice. Mating takes place out on the ice during April and May. From this time until the animals begin to come ashore in July, the park is virtually devoid of polar bears.



Park bears are part of what appears to be a discrete, southern Hudson Bay population. Their annual migration is quite limited. Animals from southern Hudson Bay do not seem to mix with those in the northern part of the bay and vice versa. By comparison with the status of polar bears elsewhere over much of their circumpolar range, the southern Hudson Bay population is in good condition. Bear numbers in this area are probably increasing, which is likely not the case in most other regions. Hudson Bay polar bears seem to be larger than their High Arctic counterparts, probably because of their less demanding environment. An annual harvest of about 10 to 30 polar bears is made by Cree Indians from Fort Severn, Winisk and Attawapiskat. Only native people are permitted to hunt polar bears and caribou in Ontario, provided that they do not threaten the resource. A cropping of approximately fifteen polar bears occurs on an annual basis. Most biologists feel this to be an acceptable take. Some of the kills may be classified as "nuisance" bears which are shot in defense of property. The harvest does not appear to jeopardize the south Hudson Bay population. At places such as Cape Churchill, where very large numbers of bears congregate in the late fall, behavioural problems would seem to indicate that there are perhaps too many of the animals in one place.

It can be lucrative to sell polar bear pelts at Montreal, North Bay, Vancouver and elsewhere. The fur is usually easy to market. Even low quality, streaked, badly prepared and unprime skins are often bought. In early 1973, Vancouver's Western Canadian Fur Auction made a record sale of polar bear pelts, all of which were sold to Japanese buyers.



Average hides in 1975 brought \$304.25 per hide in North Bay at the Ontario Trappers Association fur sales where most of Ontario's polar bear hides are marketed during the winter fur auctions. This price was down dramatically from the previous year since non-Canadians are now unable to buy Ontario polar bear hides because of the animal's endangered species status. In spite of this, excellent hides can bring up to \$1,000 per hide. This figure would represent a considerable portion of a hunter's annual income in communities such as Attawapiskat, Fort Severn and Winisk. Such an incentive to kill bears could eventually lead to an overcropping situation. The results could be particularly tragic if denning areas were located and exploited by hunters. Polar bears are given no more sanctuary from hunters inside than outside the park.

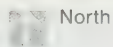
Another concern is the fact that analysed samples taken from polar bears, who are at the top of the food chain, reveal disturbingly high insecticide levels.

Polar Bear Seasonal Concentrations and Movements

- Maternity denning area
- Maternity denning sites (1974-1976)
- Travel route of pregnant female in November
- Travel routes of families during February-April
- Polar bear concentrations during July-November



1 inch equals 32 miles
1 centimetre equals 20.3 kilometres





Man and the Parkland





Prehistory

Archaeological research in the Hudson Bay Lowlands of Northern Ontario has neither been extensive nor well-defined.

During the summer of 1972, archaeological field work was undertaken by W. Irving and J. Tomenchuck of the University of Toronto at a site discovered by Mr. and Mrs. F. Cowell about 9 miles (14 km) south of the coast on the Brant River (as shown in Figure 11) during a 1971 park reconnaissance. There appear to be seven different occupation levels represented at the site, the earliest of which dates back to prehistoric times. The site has been above water for 1,000 years at most, so the early occupation would have been close to the coastline. This area was used seasonally in historic times by small, nomadic bands of Cree.

The Brant River location was the first prehistoric site in the Lowlands to be described in detail. Very sparse samples and lack of datable materials precluded the establishment of any type of cultural-chronological sequence from the Brant River investigations, yet this start did dispel the premature notion that the Lowlands had not been occupied in prehistoric times.

During the summer of 1974, J. Pollock, Northern Region archaeologist with the Ministry of Natural Resources, and W. Noble of McMaster University, undertook further archaeological work on the Lowlands. Within Polar Bear, archaeological surveys were undertaken near the Site 415 Access Zone. This work located six noticeable depressions, irregular in outline, on the crest of a prominent beach ridge. Two of these features were tested by excavation. One of the pits measured 4 feet (1.2 m) long by 3.5 feet (1.1 m) wide, and extended to a maximum depth of 21 inches (53.3 cm). Its bottom contained random poles, average diameter 2 inches (5.1 cm), and sticks average diameter 1 inch (2.5 cm). Above this was a 3-inch (7.6-cm) fibrous layer of black humus, perhaps indicating a lining of moss, spruce boughs or bark. The pit was purposely excavated as its coarse gravel fill contrasted sharply with the surrounding fine, grey, sandy subsoil. At the bottom of the north end of the pit were two cracked, woodland caribou (*Rangifer caribou*) bones, presumably smashed for bone marrow extraction (Hamalainen, 1974).

On the basis of this information, it would appear that the six pits represent underground caches for woodland caribou meat. Subsequent reopening for meat extraction is interpreted from the mottled and disturbed nature of the upper soil profiles. A large piece of wood from the bottom of one of the pits was sent for radiocarbon 14 dating. This returned an occupation date for the site of 360 ± 80 , or 1590 A.D. As a result, the pit complex has been assigned to the late prehistoric or early historic Cree.

Work to date does not offer a complete cultural sequence by any means. However, substantial progress has been made. A working framework for the known cultural-chronological sequence pertaining to Polar Bear Provincial Park and the Hudson Bay Lowlands of Northern Ontario (Pollock and Noble, 1975) follows:

Proposed Cultural Chronology for Polar Bear Provincial Park

Time A.D.	Phase or Site	Tradition
1900	Lake River	Cree
1700	Brant River	Algonquian
1500	Cache	Algonquian
1300	Cowell	Algonquian
1100		
900	Hawley Lake	Algonquian

Prehistory and History

- 1

Bunn 1803
- 2

Site 506
- 3

Site 503
- 4

Tractor Train Route 1954-1964
- 5

Taylor 1808
- 6

Site 424

7

Bunn 1803

8

Site 421

9

Site 418

10

Brant River

11

James 1632

12

H.B.C. Outpost 1904

13

Site 416

14

Site 415

15

Cree Overland Trail

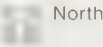
16

H.B.C. Outpost 1929-1967

17

H.B.C. and Revillon Frères 1918—late 1920'sPrehistoric SitesHistoric SitesHistoric RoutesHistoric and Prehistoric Sites

1 inch equals 32 miles
1 centimetre equals 20.3 kilometres





History

The Early Cree

The Cree, who appear to have occupied the Polar Bear Provincial Park area, at least immediately before contact with Europeans, spoke an Algonquian language and were culturally similar in most other ways to the other Algonquian nations which were spread across Canada from Newfoundland to the Rocky Mountains. Cree people occupy a geographical area stretching from James Bay to Alberta. Within this broad region, there is considerable cultural variation. However, the dialects and customs of the Cree people, who once lived within the boundaries of what is now Polar Bear Provincial Park, were very similar.

The forest or swamp Cree were a semi-nomadic, gathering people. During pre-contact times, they were probably never very numerous. A few family groups formed loosely-allied "microbands" which occupied large drainage areas, specifically the Severn, Winisk, Sutton-Kinushseo, Brant, Lakitusaki and Opinngau. The family was the only economic and quasi-political unit. The complete socialization of children was accomplished almost entirely within the family. There were no leaders with the exception of the occasional expert hunter or shaman, when guidance in hunting or magic-religion was required.

Families moved with the seasons, like the animals on which they depended. Traditionally, as now, much time during the spring must have been spent along the coast and elsewhere in search of waterfowl. Like the Lake River people, families living on the periphery of the treeless area followed the caribou out into the tundra. Inland bands likely came together at good fishing, hunting and berry-picking spots along the rivers during the summers. Autumns would often be spent near the coast in search of geese. Inland locations were chosen for winter dwelling because the elements were less severe, wood was abundant, and the chances of finding caribou, beaver and good ice fishing would be best. The uncertainty of such a gathering economy meant that famines were probably fairly frequent and sometimes severe.

Contact with Europeans remained slight for Indians who resided in what is now the park until about the turn of the century. The Sutton River people, for example, appear to have been using stone knives up until the 1880s. There were few reasons for Europeans to venture into what is now the park area. It was an inhospitable region to be avoided because of its shallow and rocky foreshores, extreme climate, swampy interior, and biting and sucking insects. Occasionally, adventurous non-natives would enter what is now the park area.

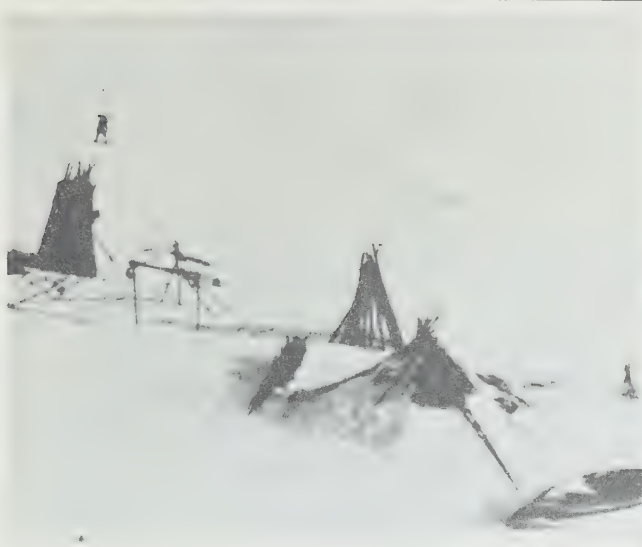
The First Europeans

Probably the first Europeans to set foot in the Polar Bear area were the crew of Captain Thomas James. As James sailed along the Hudson Bay coast of the park on August 29 and 30, 1631, he was joined by Captain Luke Foxe, probably somewhere not far from the mouth of the Winisk River. Foxe, who referred to this land as "New Yorkshire", pushed eastward to Cape Henrietta Maria, which he named *Wolsteholmes Ultimum Vale*, and returned home to England. James reached the Cape a short time after Foxe and named it in honour of the Queen of England (the consort of Charles I), Henrietta Maria, which was also the name of his ship. He then sailed southward, along the west coast of James Bay to Charlton Island where he and his crew spent a winter of incredible hardship. The following summer (1632), James returned to Cape Henrietta Maria, went ashore and erected a cross with the coats of arms of the King and the City of Bristol, the port out of which he had set sail.

The Establishment of Trading Posts

The year 1668, in which Captain Gillam sailed into Hudson Bay and James Bay in the *Nonsuch* to establish a post at the mouth of the Rupert River for the newly-formed Hudson's Bay Company, marked the beginning of sustained European contact with the native peoples of the two bays. Fort York, at the mouth of the Nelson River, was established in 1670; Moose Fort in 1671; and most significantly for the people in the future parkland, Fort Albany was in operation by 1683 and Fort Severn in 1685.

By 1698, all of these places with the exception of Fort Albany were in French hands as the result of conquests by de Troyes and later d'Iberville. Fort Albany was recaptured by the British a short time after it had been seized by de Troyes. The Treaty of Utrecht in 1713 restored these places to the Hudson's Bay Company under whose jurisdiction they remained, except for a brief interlude when La Pérouse's men sacked York Factory in 1782. York was rebuilt the following year.



A considerable amount of the early exploration of the park area was done by Hudson's Bay Company personnel. A Captain Coates, who sailed the Hudson Bay area for the company between 1727 and 1751, wrote a detailed description of the coast between Fort Severn and Cape Henrietta Maria. W. Tomison made an incredible overland journey from Fort Severn to Fort Albany. Tomison left Severn with a Cree companion on October 29, 1770, and reached Albany less than 20 days later on November 17. The pair were back at Severn before the year's end, completing the 850-mile (1,367.9-km) return trip on December 30, 1770. T. Bunn went from Fort Albany to Fort Severn by canoe and on foot in August 1803, spending time at such park locations as the Sutton River and the mouths of the Shagamu River and Shell Brook. G. Taylor, another employee of the company, described the north Winisk River area as early as 1808. J. Pritchard travelled over sections of what is today Polar Bear Provincial Park in a toboggan trip from Fort Albany to Fort Severn in January 1815.

In 1869, the Hudson's Bay Company ceded its territorial rights (Rupert's Land) to Canada. This land, including the park area, thus became a part of the Northwest Territories. In 1895, the region was designated part of the District of Keewatin, still within the Northwest Territories.

A summer post was opened near the mouth of the Winisk in 1882. Prior to this, Indians had to go to either Fort Severn, via the Mishamattawa-Shagamu coast and alternate routes, or Fort Albany by the Shamattawa-Ekwan coast route. Permanent posts were established at Winisk and Attawapiskat in 1901. A summer post was operated at the latter place from 1894 to 1901. A post was in use at Hook Point in 1904; and by 1912, there was an outpost at the mouth of the Ekwan River. Lake River Post began operation around 1929 and continued as a winter store until 1967 when it was permanently closed.

The Independent Traders

In the early 1900s, Revillon Frères of Montreal entered the James Bay area as competition to the Hudson's Bay Company. Other "free" or independent white traders also operated in the region. Revillon Frères and the Hudson's Bay Company both appear to have operated outposts, which were serviced from Attawapiskat, at the mouth of the Opinnagau River. The Revillon store began operation at Attawapiskat in 1902 and the Opinnagau post was in service at least during 1913. The Hudson's Bay Company store was in existence from about 1918 until the late 1920s, when it was replaced by the Lake River outpost.



The Post-Contact Cree

The impact of European technology and ways upon the economy and culture of the Cree was profound. The important tools of the hunters and trappers were revolutionized by guns, traps and other implements. Clothing and containers gradually changed. The design and materials of shelters were altered. Foodstuffs, particularly flour, lard and tea, injected changes and new preferences into the Cree diet. The imported food products could tide Indians over during lean periods.

The emphasis in the Cree gathering economy changed perceptibly and significantly. Fur, which had always been harvested from the land for the production of goods, now represented the wherewithal to secure the desirable implements of a different culture. Some of these implements made fur harvesting decidedly less of a challenge and hardship.

The semi-nomadic pattern of existence was also somewhat altered. Up until the mid-fifties, at a small post such as Winisk, families would leave for their traditional areas in September by canoe to spend the winter trapping in the bush. In late May, the families would return to the post to trade their catch and buy new provisions for the following winter. The remainder of the summer would be spent socializing with other families, friends and relatives, repairing possessions for the next trapping season, cutting wood, and guiding occasional visitors. Much time during early June and September would be spent goose hunting. By the end of the fall goose hunt, the Indians would leave the post for their winter trapping grounds.

The Lake River Indians developed a slight variation in this sequence of activity when the Hudson's Bay Company established a winter outpost there in the late twenties. Some families, whose trapping grounds lay close at hand, could actually live in the Lake River community during the trapping season, along with the white manager and his assistants. Trappers who lived further afield were often still close enough to the post so that the family, or at least one or two of its members, could come "out" for Christmas and perhaps Easter to trade and to take part in religious celebrations. A few of the Lake River people spent at least part of the winter above the tree line.



Only a short distance away from the prehistoric site on the Brant River is another site, which has been used, intermittently perhaps, from 1880 up until several years ago. While log cabins and store-bought wall tents are commonplace at Lake River, the wooden staging (cache) and the log (brought from south of the tree line), conical, sod-covered winter wigwam at Brant River are more reminiscent of a Cree residence as it was 100 years ago. Some of these people continued their ancestral tradition of following the caribou out into the tundra during the spring and summer. However, most returned briefly to the post in the spring and travelled down the coast to Attawapiskat, arriving there in late June. Lake River would remain largely abandoned until the families returned in mid to late August.

The Churches

Of great significance to the acculturation of the Cree were the missionaries who tended to follow closely behind the settlement efforts of the Hudson's Bay Company. The first missionaries appeared at Fort York in 1813. In 1841, a phonetic system using syllabic characters was developed by the Reverend J. Evans for use by Cree people.

The two churches which have played dominant roles in the area have been the Anglican and the Roman Catholic as represented by the Oblate Fathers of the Immaculate Conception. The latter group has been more involved in the Attawapiskat, Lake River and Winisk areas, while the Anglican Church tends to the Christian needs of Fort Severn and Kashechewan across the river from Fort Albany.

In 1892, the Oblates became established at Fort Albany. During the following year, a church was built in Attawapiskat. An Anglican church was erected there in the early 1920s. In 1895, annual one-week visits were made from Fort Albany to Winisk until 1900 when a church was built at Winisk. A permanent mission was established in 1924, a sawmill in 1948, and a recreation hall and school at later dates. Similar services were provided at Albany and Attawapiskat in addition to farms and hospitals.

As a result of the Christian influence, much of the traditional Cree religion was abandoned. Christmas and Easter became times of special celebration. Marriages were performed during the relaxed, summer season when children were home from residential schools. Less demanding medical needs were cared for at the church hospitals. Serious cases of once-prevalent tuberculosis, influenza and other diseases were referred to specialized help by church personnel.

Government Activity

Government involvement with the Cree residing around the Bay began with the signing of sections of Treaty Number 9 in 1905.

The essence of Treaty 9 is contained in a section of an adhesion made in 1930:

"Now therefore we, the said Ojibway, Cree and other Indian inhabitants, in consideration of the provision of the said foregoing Treaty being extended to us, do hereby cede, release, surrender and yield up to the Government of the Dominion of Canada for His Majesty the King and His Successors forever, all our rights, titles and privileges whatsoever in all that tract of land, and land covered by water in the Province of Ontario, comprising part of the District of Kenora (Patricia Portion) containing one hundred and twenty-eight thousand three hundred and twenty square miles, more or less, being bounded on the south by the Northerly limit of Treaty Number Nine; on the West by Easterly limits of Treaties Numbers Three and Five, and the boundary between the Provinces of Ontario and Manitoba; on the North by the waters of Hudson Bay and on the East by the waters of James Bay and including all islands, islets and rocks, waters and land covered by water within the said limits, and also all the said Indian rights, titles and privileges whatsoever to all other lands and lands covered by water, wherever situated in the Dominion of Canada. To have and to hold the same to His Majesty the King and His Successors forever.

And we, the said Ojibway, Cree and other Indian inhabitants, represented herein by our Chiefs and Councillors presented as such by the Bands, do hereby agree to accept the several provisions, payments and other benefits, as stated in the said Treaty, and solemnly promise and engage to abide by, carry out and fulfil all the stipulations, obligations, and conditions therein on the part of the said Chiefs and Indians therein named, to be observed and performed, and in all things to conform to the articles of the said Treaty, as if we ourselves had been originally contracting parties thereto. And His Majesty through His said Commissioners agrees and undertakes to set aside reserves for each band as provided by the said aforementioned Treaty, at such places or locations as may be arranged between the said commissions and the Chiefs and Headmen of each Band" (The James Bay Treaty, 1964).



In 1912, the boundaries of Ontario were established as they are at present, which meant the Hudson – James Bay Lowlands in Ontario were no longer under the jurisdiction of the federal government. Shortly after the turn of the century, a number of government sponsored scientific expeditions helped to pave the way for subsequent travellers in the area from Attawapiskat to Fort Severn. Among others, Dowling explored the Sutton River area in 1901; McInnes, the Winisk from 1903 to 1905; and O'Sullivan, the west coast of James Bay in 1904. Federal government involvement became more pronounced beginning in the 1930s by virtue of visits made to villages by members of the R.C.M.P. and later by Indian agents and others concerned with the social and medical welfare of Cree people.

Scientific surveys, both government and non-government, pertaining to the geology, mapping and flora and fauna of the area, have continued to the present. Provincial interest in the park area began shortly after World War II with efforts by the Department of Lands and Forests in 1947 to improve the management of badly depleted fur resources by means of registered traplines, based on traditionally-held areas, and modern conservation techniques. With the co-operation of Cree trappers, the operation was successful, and acceptable populations of furbearers were restored to the region.

The Mid-Canada Line

In late 1954, work on the Mid-Canada Line (M.C.L.), a series of radar stations spread out along the 55th parallel, was started. The steel towers, equipment and buildings were erected and manned by Canadian personnel. Much of the materials and equipment were brought in during 1955 and 1956, mainly by sea via Hudson Strait from the south, and from the railhead at Moosonee. Tractor trains from Gillam, Manitoba, supplied the western Ontario section of the line. Because of the shallow coastal waters, freighters anchored 8 to 10 miles (12.9 to 16.1 km) offshore, while barges ferried the cargo to land. During the winter of 1955-56, tractor trains from Moosonee assisted in the operation. In addition, the small sites continued to be serviced by these trains during the winter operation of the M.C.L. Even World War II tank landing craft (L.C.T. 8) were used during the open water season in 1956.



Royal Canadian Air Force 408 Squadron and Air Transport Command personnel were stationed at the larger sites such as Winisk and Site 415. Much aerial survey work was carried out during the squadron's tenure. The tracks made by this caravan during the mid-1950s are still plainly evident from the air during the snow-free season. In 1956, the population of Winisk was swelled by 700 labourers who helped to build the major Mid-Canada Line complex. The Winisk site was completed in 1957 and the population shrank to 159 by 1958 when all sites on the line became operational.

By 1965, the whole system was completely closed down because of improvements in the Pinetree Line to the south. The control station at Winisk was one of the last sites to be abandoned. The airstrip-hanger complex is still operated for commercial and private aircraft. The remains of seven of these sites are within Polar Bear Provincial Park, as shown in Figure 11, including two which have airstrips.

The present condition of the abandoned sites creates an interesting problem. What is to be done with them? Typical of the old stations is Site 415. From the standpoint of human history and geography, it is one of the more important sections of the park. The collection of metal buildings, radar screens, oil tanks, radio towers, and the network of roads that remain contrast vividly with the natural landscape. In the ten years which have elapsed since the sites were abandoned, the conspiracy wrought by a combination of elements and human devastation has reduced the building interiors to a shambles. The periphery of the "humanized" area has been littered with numberless 45-gallon drums. Further ravages of time may contribute to the destruction of the place. Despite its grim appearance, the history and the atmosphere of Site 415 are of unquestionable interest.

During the construction and operational periods of the Mid-Canada Line, wage labour was chosen in preference to the rigours of the trapline by many of the Cree people living around the park area. This foreign way of life soon had to be abandoned as the sites began to close down, thus injecting another series of changes into Cree life in the Attawapiskat-Fort Severn-Winisk region.



The Mid-Canada Line sites marked the demise of fur as the economic staple of the park area communities. Since that time, government has assumed an even more important role in the economic, social and cultural lives of the people. Government assistance, in terms of schooling, health care, employment, pensions and relief has been pronounced during the past two decades. Transfer payments accounted for one-half of the income of Attawapiskat residents as far back as 1953. The hardships of a winter's trapping appeal to fewer and fewer people each year. Those who continue to trap for a living are mostly old people, many of whom are reaching the point where they can no longer continue such a physically demanding vocation. Many young people acquire a taste for the comforts and challenges of the south while away at school, and leave the coastal communities permanently.

Land Disposition

At present, all of the area within the park boundaries is Crown land. A number of Cree homes at Lake River have been abandoned and the community has been derelict for the past five years. Some abandoned winter trapping shelters exist in the park. Both these previous land-uses are of historic and interpretive interest.

Formal, written authorization for the erection of structures, such as wilderness trapper's shelters and trading post buildings, has only recently been required in this part of the province.

The Marine Services Section of the Canada Department of Transport maintains a 50-foot high tower as a navigational aid at the tip of Cape Henrietta Maria. A land-use permit was granted to Aquitaine Company of Canada Limited in 1967 to maintain a small survey tower near the mouth of the Shagamu River. The structure is connected with the company's offshore exploration operating in Hudson Bay. The tower is to be removed from the park by the company in the near future.

Wood Harvesting

Wood harvesting, on a very modest scale, was carried on at Winisk to support a small mill built by the mission in 1948. The operation utilized the abundant riverbank spruce growing along the Winisk. Lumber produced from the mill was used only by the community. The operation ceased a number of years ago although some cutting continues to provide firewood for the village. No forest management or forest protection is provided for any area within the park with the exception of interior access zones.

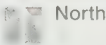
Trapping

As indicated in Figure 12, there are sections of 15 Cree-operated, registered traplines in Polar Bear Provincial Park. This includes a small area south and west of Winisk for older people who are unable to spend the winters away from their homes. Important fur species are arctic fox, beaver, Canada lynx, mink, muskrat, otter, polar bear (not trapped) and red fox.

The decline of the fur harvest in recent years in this northernmost part of Ontario can be demonstrated in terms of the region's most valuable furbearer, the beaver. During the past ten years, the beaver taken from the Attawapiskat trapline area, which includes more than half of the park, has dropped by almost 1,000 pelts annually. In the 1963 season, 10,500 beaver were taken from this area, while in 1974 only 1,510 of the animals were trapped. Although furbearer populations and fur prices have both increased during the past decade, it seems that interest in trapping in the communities near the park is rapidly declining.



1 inch equals 32 miles
1 centimetre equals 20.3 kilometres





Recreation and Research
Opportunities





Recreation Capability

In many ways, the capability of Polar Bear to support outdoor recreational activity is not high. The topography is flat, often wet, and unscenic except in a wild, languorous way. Dry land for camping is at a premium over most of the area. The lakes are shallow and very often swampy. The weather during the "warm" season, late June until about mid-September, is often a combination of unpleasantly low temperatures, strong chilling winds and overcast skies. Above the tree line, wood for fires is sometimes difficult to come by, and wood for tent poles and other camping structures is simply not available. Possibly, there is nowhere else on earth where biting and sucking insects are more of a nuisance than in the Lowlands. Because of the isolated nature of the park, there is an element of danger, however small, associated with camping there.

These characteristics tend to make many of the more traditional forms of outdoor recreation (such as swimming and sunbathing which are popular further south) unpleasant at best in Polar Bear. In addition, the physical ability of the environment to support recreation use is probably lower than in any other Ontario park.

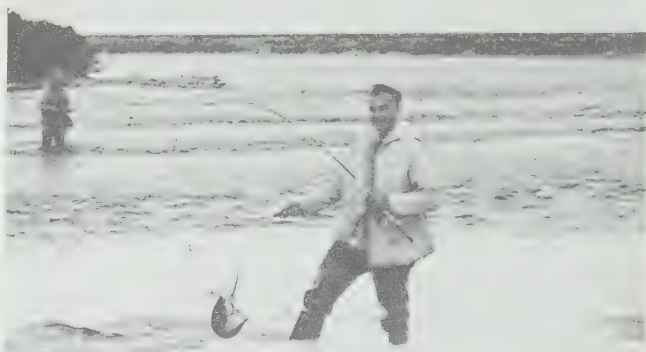
Existing Development

Sport Fishing

Many of the streams, which flow into Hudson Bay and James Bay from Polar Bear Provincial Park, contain excellent populations of brook trout, while some of the larger rivers such as the Winisk also have northern pike. Walleye (yellow pickerel) also occur infrequently in the Winisk.

With the exception of an unsuccessful attempt to introduce chum salmon into the Winisk River and Mishamattawa River in 1955, there has been no stocking program in the park. Sport fishing in Polar Bear is governed by The Ontario Fishery Regulations (Divisions 24 and 25) and no special regulations, seasons or licences are in effect at present.

One of the most heavily fished sections of the park is the Brant River. Because of its suspected low productivity, the Ministry is concerned about the possibility of over-fishing in this and similar streams. Survey work to determine the fishing potential of the Brant was carried out during 1971 – 1975.



Hunting

Hunting in Polar Bear Provincial Park by other than native people is permitted only at two Cree-operated goose camps, near the mouths of the Sutton River and Shagamu River, which were in operation before the park was created. As the fish and goose camp operation provides one of the very few opportunities for Cree residents to sustain themselves economically, these camps have been retained even though their existence is at odds with the protection clause of the wilderness park class (Ontario Provincial Parks Classification and Zoning System, 1975). Geese, ducks, ptarmigan and snipe only may be shot at these camps in accordance with Ontario and federal government regulations. Some of the best goose hunting in North America is available in this area. No additional commercial establishments will be allowed in the park. The camps will be permanently closed once the present operators decide to discontinue their use.

Future Possibilities

Although almost totally undeveloped, the park does have the capacity to support certain kinds of outdoor recreation activities, some elements of which cannot be duplicated in any other Ontario park.



Canoe tripping on the Brant River



Canoe Tripping

Canoe tripping in Polar Bear can be a rewarding experience. As shown in Figure 13, some of the better canoeing possibilities are the Brant, Kinushseo, Lakitusaki, Mishamattawa, Opinnagau, Shagamu, Sutton and Winisk rivers. Of these, the Sutton and the Winisk – Mishamattawa-Shagamu appear to offer the most to canoeists.

Trips down the Sutton can begin at the north end of Hawley Lake. The journey to the mouth of the river is about 70 miles (112.7 km) long, an easy five-day venture because of the good current and a total absence of portages. An aircraft pick-up can be made at the goose camp near the river mouth. The trip features river travel on a clear-water stream with well-drained banks which are excellent for camping. The landscape is wild and uncluttered. The flora and fauna are varied. Both change perceptibly as one approaches the coast. Interesting evidence of Indian occupation, past and present, lie within view at intervals along the route. Finally, some of the best brook trout fishing anywhere in Ontario is available on the Sutton.

The Winisk – Mishamattawa – Shagamu route is probably a prehistoric, inland water passage between the Winisk River and Severn River. Winisk Indians certainly used this waterway to trade at Fort Severn before the Hudson's Bay Company established a summer post near the mouth of the Winisk River in 1894. This trip is not without difficulties; if a clockwise route is taken, travel on the Winisk and Mishamattawa will be against a considerably strong current. Periods of low water can also make the journey a tough one. A major advantage, however, is that only one long portage, from the Mishamattawa into the Shagamu River drainage system, is required during the 140 mile (225.3 km) trip from Winisk to the mouth of the Shagamu River, where an aircraft pick-up can be made.

It is also possible to return to Winisk along the coast, a distance of about 90 miles (144.8 km) from the Shagamu, thus making a circle route out of this trip. However, because of the shallow, muddy, rock-strewn shoreline, tidal effects, cold, severe winds, fog, and lack of good landmarks, this should be attempted only with a knowledgeable guide, a canoe of at least 20 feet (6.1 km) in length, and other essential equipment. Another alternative is to go north along the coast from the mouth of the Shagamu to Fort Severn, a distance of 35 miles (56.3 km). This route offers most of the advantages of the Sutton River trip in addition to the pleasant and interesting Big Shagamu Lake area.

The other rivers mentioned also have the virtues of few portages, excellent brook trout fishing, interesting historical and cultural remnants in an otherwise totally wild, natural setting. In terms of these criteria, sections of Polar Bear Provincial Park, such as canoe tripping areas, have few peers in Ontario. Canoeing on much of the Brant River, in addition, offers the unquestionable thrill of tripping in the tundra.

Backpacking

One rapidly expanding form of outdoor recreation which Polar Bear could support better than most Ontario parks is backpacking. The hundreds of miles of treeless beach ridges in the tundra section of the park would be ideal for wilderness hiking and camping. The 18-mile (29.0 km) road from Site 415 to the James Bay coast might also be used for this sort of activity. A vital consideration in connection with backpacking and camping on tundra beach ridges must be the question of environmental protection. While the lichen-heath communities will stand a higher degree of human use than their High Arctic counterparts, the tundra heaths certainly lack resilience and high resistance to the environmental pressures of unrestricted camping and hiking.

Interpretation

The possibility of more intrepid park visitors spending a few days or longer on a trapline with its Cree operator, for a fee, should be considered.

Visitors en route to access zones will be able to view the remarkable patterns and colours of Polar Bear's landscape from the air. This should be a recreational experience of considerable value in its own right.

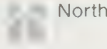
The main incentive for people to visit Polar Bear, in addition to and along with the desire for a wilderness "experience" (the most important element in any recreation experience in this park), will be to study, photograph and otherwise enjoy the natural and human history of the park. The subject matter is of considerable interest, particularly the mixture of arctic and sub-arctic faunal and floral elements. This composite, together with the historical legacy which lies within Polar Bear Provincial Park, should challenge the interest and imagination of visitors indefinitely.

Possible Canoe Routes

- Canoe Routes
- Winisk River
- Provincial Park
- Cree Goose and Fish
- Camps (Hawley Lake—fish camp only, Winisk—goose camp only)



1 inch equals 32 miles
1 centimetre equals 20.3 kilometres





Special Equipment

An important consideration in any trip to Polar Bear Provincial Park is equipment. In addition to the items carried on wilderness sojourns in parks such as Quetico and Algonquin, the following gear is essential:

1. Warm clothing including long underwear, parka, mitts and rain and windproof outer garments;
2. A winter-weight sleeping bag (the combination or sandwich-type down-filled bags which feature a summer inner robe and outer bag for cooler weather, the two to be used in combination for cold nights), to provide protection against the wide range of temperatures which can be expected during summer in the park;
3. A light, waterproof and condensation-proof tent, with a minimum acceptable vertical dimension (because of wind problems in the coastal and tundra areas), aluminum poles (especially for use above the tree line where wooden poles are not available), strong, fine-meshed insect netting, heavy-duty zippers and a storm door. It should be in a bright colour (blaze orange and yellow are best) which is easily visible from the air or the ground at a distance;
4. An ample supply of insect repellants and pyrethrin type insect coils;
5. An extra supply of food for at least a week because of the high odds of being "weathered in", missing aircraft pick-ups, etc. Freeze-dried provisions are recommended, as weight is often a critical factor.
6. A well-stocked first aid kit.

Research

Because of its relatively uncomplicated biological structure and because of man's increased activity in tundra regions, research of this area is today fashionable and productive. Polar Bear's arctic tundra is one of the southernmost such regions in the world, and it is comparatively closer to the larger research centres on this continent. For these reasons, the park may receive considerable scientific attention. This will be the case particularly if modest research facilities and accommodation were to be developed, for example, at the Site 415 Access Zone. All research activities in the park would be subject to approval by the Ministry of Natural Resources.



Hiking on lichen heath near Site 415

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Ministry of
Natural
Resources

Hon. Frank S. Miller
Minister

Dr. J. K. Reynolds
Deputy Minister

April, 1977

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